



Ministry of Minister
Natural
Resources

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December 23, 1985

The Honourable Jim Bradley
Minister of the Environment
15th Floor, 135 St. Clair Ave. W.
Toronto, Ontario
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Dear Mr. Bradley:

Re: Class Environmental Assessment for
Timber Management on Crown Lands in Ontario

It is with pleasure that I submit this copy of the Ministry of Natural Resources' Environmental Assessment for Timber Management. The environmental assessment is intended to satisfy our obligations under the Environmental Assessment Act. Submission before December 31, 1985, will serve to meet condition #8 of the Exemption MNR 11/9. As a result, the Exemption will remain in effect until a decision on approval is made with respect to the environmental assessment.

My Ministry intends to follow the planning process included in this environmental assessment, while the review and approval process is taking place. To demonstrate our commitment, we have revised our manual which guides timber management planning, to make it consistent with the approach in the environmental assessment, and to have it apply both to MNR and forest companies. I am forwarding a copy of the manual, for your information.

The printing of our environmental assessment will not be complete until the second week of January. At that time, I will forward an additional 100 copies, to allow your staff to commence the government review. I look forward to a productive process of review, and will be pleased to provide any further explanation of our proposal, if you wish.

Yours sincerely,

Vincent G. Kerrio
Minister

SUMMARY FORM

SUMMARY FORM FOR AN ENVIRONMENTAL ASSESSMENT SUBMISSION

Re: An Environmental Assessment received from the Ministry of Natural Resources for Timber Management on Crown Lands in Ontario.

Environmental Assessment Number 2-77-0001-000

PART ONE: THE UNDERTAKING

(1) INTRODUCTION

Through this submission, the Ministry of Natural Resources is seeking approval for the undertaking of Timber Management on Crown Lands in Ontario.

(2) PURPOSE OF THE UNDERTAKING

The purpose of the undertaking is to provide a continuous and predictable supply of wood for Ontario's forest products industry.

(3) DESCRIPTION OF THE UNDERTAKING

Timber management consists of the following sequence of related activities:

- (i) provision of access to harvestable timber;
- (ii) harvest of the timber for transport to wood-processing facilities;
- (iii) renewal of that timber resource, which involves:
 - (a) preparing the site for regeneration;
 - (b) regenerating the timber by natural or artificial means;

- (iv) maintenance of the timber resource, which involves:
 - (a) tending operations to ensure successful growth of the new forest;
 - (b) protection of the timber resource from insects and disease.

Timber management takes place within management units on Crown land. FIGURE 3.2-1 shows the general outline of the area of the undertaking. On-the-ground timber management activities, however, may be restricted to specific areas within individual management units.

(4) IMPLEMENTATION OF THE UNDERTAKING

A Timber Management Plan must be prepared for each management unit every five years according to the planning process described in PART TWO, Chapter 2 of this Class Environmental Assessment. Only upon approval of the plan can the various activities that comprise timber management be implemented. Implementation of these operational activities must comply with the specific requirements set out in each Timber Management Plan.

MNR maintains control and responsibility over the implementation of timber management through its approval of all Timber Management Plans. Authority for this control is granted through The Crown Timber Act.

(5) A CLASS ENVIRONMENTAL ASSESSMENT APPROACH

MNR has submitted a Class Environmental Assessment because it is the most appropriate approach for defining a common and consistent planning process and for ensuring that the purpose of The Environmental Assessment Act is attained.

Interpretations of The Environmental Assessment Act have provided for the use of Class Environmental Assessments for common sets of activities. Timber management involves a common set of activities wherever practised. Although these activities are diverse, they are interrelated and all play a role in the achievement of the purpose of the undertaking.

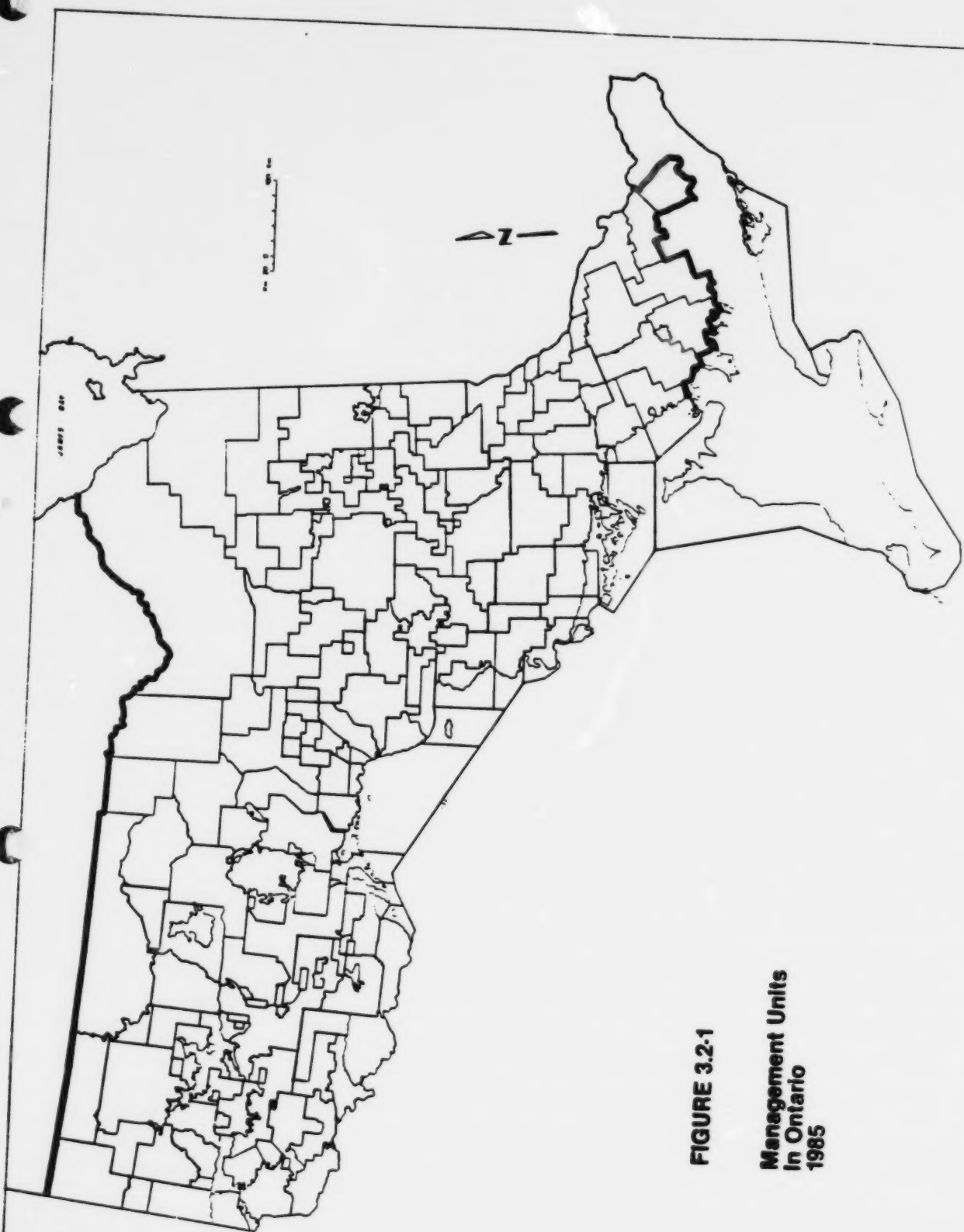


FIGURE 3.2-1

**Management Units
in Ontario
1985**

These activities occur in every management unit, and generally have a predictable range of environmental effects. Timber management is also dynamic in nature and the activities are carried out over a long term. The optional methods of carrying out each activity can be identified over cycles of 80 years.

The undertaking is also subject to the effects of unpredictable events such as forest fires and insect infestations. A consistent planning process provides the flexibility necessary to deal with such circumstances in a timely manner.

A Class Environmental Assessment is submitted because it defines a common and consistent planning process which will ensure compatibility and co-ordination between management units across the province. A Class approach also provides a common, predictable and equal opportunity for public consultation in the preparation of Timber Management Plans for every management unit.

(6) ALTERNATIVES TO THE UNDERTAKING

- (i) The "Do Nothing/Null" Alternative: This alternative involves no utilization of the timber resources on the province's Crown lands to supply the wood requirements of Ontario's forest industry. With this alternative, wood supply would be obtained from patented land in Ontario and/or from outside the province.
- (ii) The "Harvest With No Renewal" Alternative: This alternative would involve obtaining wood from Crown land forests. However, renewal of Crown forests would be left entirely to natural forces.

Recycling (of waste paper, cardboard boxes, etc.) is assessed as providing a contribution to the purpose of the undertaking, but not as providing a reasonable "alternative to" the undertaking.

(7) THE UNDERTAKING AND "ALTERNATIVES TO":
ADVANTAGES AND DISADVANTAGES

(i) Timber Management

The proposed undertaking provides, on a continuous basis, the kind and quantities of wood necessary to sustain a viable forest products industry in Ontario. That industry's substantial contribution to the economy of the province would continue. Communities for which the wood product industry is the main economic base could continue to rely on employment from that sector.

The potential negative impacts on the natural environment associated with the undertaking can be prevented, minimized or mitigated to an acceptable level through careful planning and proper implementation of timber management operations prescribed in Timber Management Plans.

(ii) The "Do Nothing/Null" Alternative

The existing forest products industry in Ontario could not be sustained under this alternative. Negative social and economic impacts associated with this alternative, particularly in northern Ontario, would far outweigh any positive benefits to the natural environment which might result from eliminating timber management activities on Crown lands.

(iii) The "Harvest With No Renewal" Alternative

This alternative could support the industry's wood requirements for a considerable period of time. However, over time wood supplies would be less reliable and more costly. Eventually, this alternative would result in a smaller and less competitive forest industry. Serious negative and social impacts would result, particularly in northern Ontario. In addition, the lack of renewal efforts would have both short-term and long-term negative effects on the natural environment.

(8) RATIONALE FOR THE UNDERTAKING

Timber management best provides a continuous and predictable supply of wood for Ontario's forest products industry, with largely positive social and economic effects and acceptable environmental consequences.

Ontario's timber resources on Crown lands offer the forest products industry a significant competitive advantage because of their quality and proximity to major world markets. The forest products industry makes a major contribution to the provincial economy and has become vital to both the economic and social well-being of the province. Many communities, particularly in northern Ontario, are dependent on the continued viability of individual mills.

Timber management as recommended by the Ministry provides for comprehensive planning of activities with consideration of other users of the forest. As well, timber management activities will be carried out in ways that will prevent, minimize or mitigate significant environmental concerns.

(9) ALTERNATIVE METHODS OF CARRYING OUT THE UNDERTAKING

The undertaking consists of four activities which are normally carried out in sequence: (i) provision of access to the timber resource; (ii) harvest of the timber; (iii) renewal of the timber resource; and (iv) maintenance of the timber resource.

(i) Provision of Access

Roads provide the most common form of access for timber management in Ontario.

(ii) Harvest

There are three broad alternative silvicultural systems used to harvest timber in Ontario: the clear cut, the shelterwood, and the selection silvicultural systems.

(iii) Renewal

Renewal of the timber resource may involve two separate stages: site preparation and regeneration. Site preparation is carried out to improve the probability of survival of seeds or seedlings, either by mechanical or chemical means, or by prescribed burning.

The process of regeneration may occur through natural means or artificial means. Natural regeneration relies on growth from natural seed sources, saplings which remain after harvest, or from coppice growth. Artificial regeneration involves either the sowing of seed or the planting of tree seedlings.

(iv) Maintenance

Maintenance operations may involve two activities: tending and protection. Tending consists of efforts to encourage growth of desirable trees and tree species and may be undertaken by removing undesirable or competing vegetation. It may include thinning, or removing undesirable trees to encourage growth of the remaining stand. Protection normally involves the use of pesticides to minimize the effects of insects and disease.

(10) DESCRIPTION OF THE ENVIRONMENT AFFECTED BY THE UNDERTAKING

The environment which is affected by the undertaking is broad and diverse. The environment is described in each management unit as a requirement of the timber management planning process, and is described in a general sense in Chapter 10.

The most significant distinction in the physical environment is the type of forest in which the undertaking takes place. Timber management in Ontario is carried out in two forest regions: the Boreal Forest Region and the Great Lakes-St. Lawrence Forest Region.

The Boreal Forest Region, which occupies the greater part of the forested area in the north of the province, is primarily coniferous. The principal tree species are white spruce, black spruce, balsam fir, jack pine, trembling aspen and white birch.

The Great Lakes-St. Lawrence Forest Region is characterized by forest stands of a very mixed nature. The principal tree species are conifers, such as white and red pine and hemlock, along with hardwoods such as yellow birch, sugar maple, oak and basswood.

(11) POTENTIAL ENVIRONMENTAL EFFECTS OF THE UNDERTAKING

The environmental effects of the activities of access, harvest, renewal and maintenance are addressed separately in Chapter 11. The effects of each activity and the alternative methods of carrying out each activity are discussed under the headings of aquatic effects, terrestrial effects and social, economic and cultural effects. This discussion also offers insight into the environment that is affected by the undertaking.

(i) Provision of Access

The construction of a road access system results in temporary and permanent alterations to the environment. The impacts on the aquatic and terrestrial components of the environment are primarily related to the removal of vegetative cover and soil disturbance. These direct effects may have indirect effects on water quality, streamflow characteristics and the abilities of watercourses to sustain aquatic life. Road construction may have an impact on wildlife habitat, and may improve access to wildlife populations for hunting and trapping.

The provision of road access into areas previously not accessible by road has a wide range of positive and negative effects on other resources and users. Where rail or water access is used as part of the access system, there are normally fewer concerns. Those concerns are primarily related to the effects on the aquatic environment and on other users of the travelways.

(ii) Harvest

Effects of harvest operations on the aquatic environment are related to increased surface runoff and total water yield of the forested area, which may alter runoff rates and streamflow regimes. Groundwater supplies, soil nutrient balance, evapotranspiration rates, water temperature and water quality impacts may also result from harvest operations. The severity of these effects normally diminishes over time with revegetation of sites.

The terrestrial effects of harvest operations are mainly related to the temporary loss and alteration of wildlife habitat. From a recreational and tourism viewpoint, the effects of harvest are related to the temporary loss of aesthetic and wilderness appeal.

Direct economic benefits are gained from the wood which is harvested.

(iii) Renewal

Site preparation, particularly mechanical site preparation, increases the potential for erosion, because the soil is disturbed during operations. Herbicides may affect water quality, and possibly aquatic vegetation, if spills, spray drifts or surface runoff concentrate chemical herbicides.

Most of the impacts of site preparation on recreational activities are related to aesthetics. Prescribed burning must be carefully controlled.

Regeneration has minimal adverse effects on the aquatic environment, and reduces or reverses many of the potential impacts of harvest operations. The re-establishment of forest cover will provide habitat for wildlife and will restore the aesthetic appeal of an area for tourism and outdoor recreation.

(iv) Maintenance

The principal maintenance operations carried out in Ontario involve tending and pest control. Temporary impacts on the aquatic environment and wildlife habitat may occur through the use of chemical or biological agents. On the other hand, chemical and biological agents used for protection operations reduce insect damage in commercial and high-value forests. This may save high-value timber for production purposes. The use of pesticides may also preserve tourism and outdoor recreational values which might otherwise be damaged or destroyed by insect pests. The maintenance of a healthy forest can also lessen potential destruction of lodges, outpost camps and facilities by reducing forest fire hazards.

PART TWO : THE TIMBER MANAGEMENT PLANNING PROCESS

(1) INTRODUCTION

All timber management activities on Crown lands are addressed in Timber Management Plans which are prepared for each management unit in the province. The Timber Management Plan provides specific direction for all timber management operations within a management unit.

Timber Management Plans must adhere to policies established by Cabinet and the Ministry of Natural Resources and have regard for MNR's land use guidelines. Within this framework, the determination of operations within a management unit is based primarily on specific information pertaining to that individual unit.

(2) THE TIMBER MANAGEMENT PLAN

A Timber Management Plan consists of a 20-year projection which provides long-term continuity and a five-year plan of operations which describes the operations to be carried out in the next five years. At the end of that five-year term, a new plan is produced extending the original 20-year projection for an additional five years, and outlining the details of operations to be undertaken during the next five-year term.

The timber management planning process consists of five steps:

STEP ONE: ASSEMBLY OF BACKGROUND INFORMATION

STEP TWO: ESTABLISHMENT OF MANAGEMENT OBJECTIVES AND STRATEGIES

STEP THREE: SELECTION OF SILVICULTURAL SYSTEM(S) AND ROTATION(S)/CUTTING CYCLE(S)

- STEP FOUR: DETERMINATION OF MAXIMUM ALLOWABLE DEPLETION
AND DEPLETION RATE
- STEP FIVE: SELECTION OF AREAS FOR, AND DETERMINATION OF,
OPERATIONS

Step One: Assembly of Background Information

Information which contributes to the determination of the long-term direction for timber management on the management unit, and to the detailed planning of operations, is collected in this step, including detailed information on timber resources and other resources. Input from the public, other government agencies and other external participants is solicited as part of this information assembly. This information serves to identify where operations may be carried out within the management unit.

Step Two: Establishment of Management Objectives and Strategies

Before any planning of operations is carried out, objectives for timber management on the management unit are established. Such objectives may be general, relating to the maintenance of a wood supply, or specific, identifying certain land areas as requiring particular consideration.

Strategies by which these objectives might be met are also addressed in this step. Strategies also may be general, addressing management principles such as improvement of productivity, or they may be specific, for example, by giving priority to accessing over-mature timber.

Step Three: Selection of Silvicultural System(s) and Rotation(s)/Cutting Cycle(s)

Basic decisions are made about the type of management system which will be employed in each forest stand (i.e. a forested area having the same predominant species) in the management unit. For each forest stand or group of stands a decision is made about whether the stand will be managed according to the clear cut, shelterwood or selection silvicultural system.

The rotation period or the cutting cycle is also determined during this step.

Step Four: Determination of Maximum Allowable Depletion and Depletion Rate

The amount of land in the management unit from which timber may be depleted over a five-year term by harvest or by other means such as fire, insects and disease is determined during this step. The Maximum Allowable Depletion is a calculation based on a formula which incorporates Forest Resource Inventory information and other variables. Together, these variables serve to define an annual level of harvest which may be carried out on a sustained yield basis.

Step Five: Selection of Areas for, and Determination of, Operations

Decisions are made in this step on proposed activities within the management unit. Initially, the general level of activity for the entire unit for the 20-year period is determined. The details of operations for the next five-year term are then addressed in a more specific fashion.

(i) Twenty-Year Period

For the 20-year period, the land area of the management unit on which operations may be carried out is identified. Within that land area, areas of value to other users, or areas of concern, are identified on a preliminary basis.

Planning of primary access roads is then undertaken on the basis of broad corridors. Alternative road corridors are identified and evaluated on the basis of the effectiveness of access to areas eligible for operations, accommodation of preliminary areas of concern, and costs.

(ii) Five-Year Term

For the five-year term of the plan, decisions are made about the specific operations which will be carried out over that period of time. Specific sites are identified for harvest, renewal and maintenance from the areas identified for the 20-year period as being eligible for operations.

The determination of how operations are carried out involves a two-tiered planning approach. In normal operating areas (i.e. outside of specific areas of concern), a general approach is used. Within specific areas of concern, a detailed and comprehensive planning process is applied.

Road locations in normal operating areas are refined to a 500 metre corridor.

The determination of operations within areas of concern must undergo a comprehensive evaluation so that specific operating prescriptions can be identified. This involves the consideration of alternative methods of carrying out operations to determine whether or not operations may proceed and if so, how. The objective of this analysis is to decide whether, and how, timber management operations can proceed in areas of concern in light of the other resource values which have been identified.

The analysis will determine the specific operational prescriptions which may be undertaken for that area, including the identification of precise road locations. Depending on the particular values associated with an area of concern, it may be decided that timber management operations will not be permitted. In such cases, a reserve will be created.

The unpredictable nature of insect and disease infestations does not permit for the detailed planning of protection operations on a five-year basis. Planning for these operations will be carried out annually, with annual opportunities for public consultation.

(3) PUBLIC CONSULTATION AND "BUMP-UP"

The timber management planning process provides four formal opportunities for interested and affected parties to become involved in the preparation of a Timber Management Plan: i) at the outset; ii) when preliminary proposals are developed, prior to the production of a draft Timber Management Plan; iii) once the draft plan is produced; and iv) after plan approval, but before implementation.

In cases of significant public controversy, the plan or any component of the plan (i.e. a road or a specific harvest operation) may have to be "bumped-up" to an Individual Environmental Assessment. A "Bump-up" may occur at any time during the process up to the end of the public review period of the final plan inspection. A "Bump-up" may be voluntarily undertaken by the Ministry of Natural Resources or requested by a member of the public.

PART THREE: IMPLEMENTATION MANUALS AND MONITORING

(1) IMPLEMENTATION MANUALS

MNR has produced a number of manuals and guides which provide direction for the implementation of timber management operations. Some of these, such as the silvicultural guides, are specifically directed to ensuring that timber management operations are carried out in a consistent and functional manner. Other guidelines address how other resource values are to be taken into account during the planning and implementation of timber management operations. As well, there are additional documents which include standards and provide direction on how to prevent, minimize or mitigate possible adverse effects of timber management operations.

(2) MONITORING AND ASSESSMENT

MNR has in place a system of monitoring compliance with Timber Management Plans and assessing performance. Information on past operations contributes to a regular assessment of achievements and provides input to the preparation of subsequent Timber Management Plans.

This monitoring system is supplemented by operational audits undertaken by MNR's Forest Resources Group, Main Office. Additional monitoring of operations is undertaken at the field level by means of cut inspections and contract administration. Opportunities are provided for monitoring and assessing the effectiveness of operations and mitigation measures in areas of concern. Special audits by the Provincial Auditor or experts from outside of the Ministry of Natural Resources also are undertaken from time to time.

STUDIES AND REPORTS DONE IN CONNECTION WITH THE UNDERTAKING

(1) PUBLIC AND EXTERNAL PARTICIPATION

The Ministry undertook a review of a draft Class Environmental Assessment, beginning in September, 1983. This review involved interest groups, government agencies and representatives of the forest and tourism industries. The Ministry received 41 submissions as a result of this review.

These submissions were analyzed by the Ministry and consideration was given to the concerns which were expressed. Additional meetings were held with a number of the respondents to address specific issues. Beginning in February, 1985, the Ministry returned to the external participants to discuss how it intended to respond to the submissions in a revision of the environmental assessment. The Ministry also invited submissions on these proposals and another twelve submissions were received. These responses were considered in the development of the final document.

(2) REPORTS AND DOCUMENTS

The "Timber Management Planning Manual for Crown Lands in Ontario"¹ was produced in conjunction with this environmental assessment. The planning process and the documentation requirements for the preparation of Timber Management Plans are outlined in this manual. This manual, which provides direction to personnel responsible for preparing these plans, was developed to reflect the planning requirements which are outlined in this environmental assessment.

The Ministry has produced or revised a number of guidelines which are intended to identify possible techniques for preventing, minimizing or mitigating impacts of timber management operations on other uses and users of the forest. This includes guidelines for the management of moose, fisheries and tourism values. The guidelines which deal with tourism values, for example, were developed as a result of a recent series of meetings held throughout the province involving representatives of both the tourism and forest products industries. Public

consultation has and will continue to play an important role in the refinement of these guidelines.

**CLASS ENVIRONMENTAL
ASSESSMENT
FOR
TIMBER MANAGEMENT
ON CROWN LANDS
IN
ONTARIO**

FOREWORD

The Ontario Ministry of Natural Resources is responsible for timber management on Crown lands in Ontario. Through the submission of this Class Environmental Assessment, MNR is seeking approval under The Environmental Assessment Act for the manner in which timber management will be carried out.

Timber management is regarded as an "undertaking" as defined in The Environmental Assessment Act. Without a specific exemption being granted, that Act prohibits all such undertakings proceeding without the approval of the Minister of the Environment. That approval is obtained by submitting an environmental assessment to the Minister for his acceptance and approval.

The Ministry of Natural Resources has carried out the undertaking of timber management pursuant to interim exemptions since The Environmental Assessment Act came into force. The present exemption provides that it will expire on December 31, 1985 unless, "A Class Environmental Assessment for Forest Management has been submitted by the Minister of Natural Resources before December 31, 1985...". If a Class Environmental Assessment is submitted in accordance with that term of the Exemption Order, the order provides that the exemption, "shall remain in effect until a decision on approval is made in respect of this (the exemption) order...".

To obtain approval under The Environmental Assessment Act, certain information must be submitted to the Minister of the Environment. The required information is described in Section 5(3) of The Environmental Assessment Act. For the undertaking of timber management, that information is contained in PART ONE of this environmental assessment.

PART ONE, Chapter 2 states the purpose of the undertaking of Timber Management as follows:

"To provide a continuous and predictable supply of wood for Ontario's forest products industry."

PART ONE, Chapter 3 describes the activities that comprise timber management which, if carried out in an environmentally sound way, will achieve the purpose

of the undertaking and the purpose of The Environmental Assessment Act. Timber management is described as the sequence of activities comprised of the provision of access to the timber resource, and the subsequent harvest, renewal and maintenance of that resource. That description is elaborated upon in PART ONE, Chapter 9, where various alternative methods of carrying out those activities are explained in detail. PART ONE, Chapter 10 provides a brief explanation of the environment where timber management takes place, and is followed, in Chapter 11, by a description of the broad range of possible environmental effects of all activities that constitute timber management. PART ONE, Chapter 11 also further describes the environment affected by the undertaking, as it outlines the possible effects of each timber management activity under the categories of aquatic, terrestrial, social, economic and cultural effects.

The requirement of Section 5(3) of The Environmental Assessment Act to examine alternatives to the undertaking is addressed in PART ONE, Chapters 6, 7 and 8. Chapter 6 describes the alternatives; Chapter 7 provides an analysis of those alternatives; and Chapter 8 explains why timber management on Crown lands, as proposed by the Ministry, is the most appropriate way to achieve the purpose of "providing a continuous and predictable supply of wood for Ontario's forest products industry".

This document is a Class Environmental Assessment. Therefore, the manner in which the Ministry of Natural Resources proposes to meet the requirements of The Environmental Assessment Act is to obtain approval of the undertaking by demonstrating that, if the undertaking is implemented in accordance with the planning process described in PART TWO, Chapter 2 the purpose of The Environmental Assessment Act will be achieved.

The planning process that the Ministry proposes to follow is described in detail in PART TWO, Chapter 2 of this environmental assessment. The process will be applied to all management units in the province, by MNR staff or by staff of forest companies. The primary product of this planning process will be a Timber Management Plan for each management unit. That plan will cover a period of five years, and will contain terms and conditions which must be adhered to by any licensee under The Crown Timber Act, when carrying out timber management operations. In addition, and perhaps most importantly, no timber

management activities can be carried out in a management unit without such an approved Timber Management Plan. Regardless of who actually carries out the timber management activities, all plans are approved by the Ministry of Natural Resources.

This environmental assessment contains a number of appendices related to PART TWO: THE TIMBER MANAGEMENT PLANNING PROCESS. Those parts of the planning process dealing with access roads and with operations in areas of concern to other users/uses are elaborated upon in APPENDICES I & II. The procedure used for planning the protection of the forest from insects and disease is described in APPENDIX III.

The description of the planning process is not complete without reference to the Ministry's manual entitled, "Timber Management Planning Manual for Crown Lands in Ontario"¹. In addition to describing the required contents of a Timber Management Plan, this manual describes the records which must be kept in order to facilitate efficient management of the timber resource.

PART THREE, Chapter 1 describes a variety of manuals which direct the implementation of timber management operations. These manuals describe actions which can be taken in varying situations to prevent, minimize or mitigate the effects of timber management activities on the environment.

PART THREE, Chapter 2 addresses how MNR will monitor the implementation of approved plans.

The preparation of this Class Environmental Assessment continues along a direction which has always maintained an openness to public review and response. APPENDIX V summarizes the extensive program of pre-submission consultation undertaken by MNR following release of a draft Class Environmental Assessment in 1983.

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PART ONE

THE UNDERTAKING

PART ONE: THE UNDERTAKING

1. HISTORICAL BACKGROUND

The undertaking of timber management has a long history in the Province of Ontario. The preparation of this Class Environmental Assessment represents one important new step in this history. This chapter will review the historical background, pointing out the various elements that have shaped MNR's current approach to timber management and showing the gradual evolution of a process for planning and controlling timber management on Crown lands.

The first legislated control over harvesting of timber came with The Crown Timber Act, passed in 1849. This act provided the basis for developing a timber licensing system, the essential elements being put into place over the next twenty years.

In the late 1890's and early 1900's, two events were taking place that led to important changes in legislation, and in timber management practices. First, public concern was being drawn to wasteful practices in the province's pine forests of southern Ontario, which led to Ontario's initial efforts in artificial regeneration. During the same period, the pine sawlog industry began to decline, and interest shifted to the development of a pulp and paper industry based on the vast spruce forests of northern Ontario. By the late 1920's, this industry was well-established with 13 mills.

Between 1927 and 1929, the Legislature of Ontario passed a number of acts related to timber management. The most important were The Provincial Forests Act, which permitted public lands to be set aside to protect future timber supplies, and The Pulpwood Conservation Act. This act introduced the concept of sustained yield management into legislation, by requiring all pulp companies with licensed holdings on public lands to manage the Crown forests on a sustained yield basis.

These statutes embodied the basic principles of sound timber management. However, in practice, they were ineffective, largely due to the economic

depression of the 1930's. As well, The Crown Timber Act of that time was based on two conflicting assumptions -- that the sawlog and pulp industries could expand infinitely, and that the province's timber resources were inexhaustible. In general, the period from 1930 to 1949 was one of exploitation of timber resources with very little done to ensure that industry complied with The Pulpwood Conservation Act.

During the 1940's, the Ontario Department of Lands and Forests was reorganized, and in 1947, the Kennedy Royal Commission on Forestry was formed. These two developments led to a renewed emphasis on the need for sound timber management, and a recognition that public funds must be invested to ensure forests for the future.

The Forest Management Act of 1947 embodied the most recent attitudes toward timber management. This legislation gave all companies in the forest products industry equal responsibility for timber management, and it was this legislation that first required the production of forest management plans. As is the case today, these plans had to be reviewed and approved by the provincial government, and operations had to conform to approved plans. In addition to these new planning requirements, the forest companies were made responsible for the regeneration of the areas harvested.

On the majority of Crown lands, the government's role was to license companies and approve and supervise their activities. Government foresters actually carried out timber management only on Crown lands that were not under licence to the large companies of the forest products industry.

The period following the Second World War was a time of greatly increased effort in timber management. That effort led to the increased employment of professional foresters and technicians, both by government and companies. It was also during this period that timber harvesting became largely mechanized.

In 1953, a new Crown Timber Act was passed, which consolidated and revised a number of the statutes that governed the administration of timber resources on Crown lands. The legislation replaced all the old formal agreements with 21-year licences issued by Order-in-Council.

Under the new Crown Timber Act, the forest products companies remained responsible for planning, harvesting and regeneration. However, little artificial regeneration of harvested areas was actually carried out, partly because of the industry's reluctance, and partly because the expertise necessary to regenerate forests was not well developed. What expertise existed remained largely with government foresters. As well, early reforestation efforts in northern Ontario during the 1950's relied on experience, and often on planting stock, that had been developed in the reforestation of sandy lands of southern Ontario. These efforts often failed when used in the vastly different soils and climate of the north. It was some time before the regeneration techniques were developed that were appropriate to the cutover boreal forests of Ontario.

By 1960, it was clear that the existing system was not providing for effective regeneration. In response, The Crown Timber Act was amended in 1962 and full responsibility for regeneration was assigned to the province. The government's fledgling efforts and accomplishments in regeneration increased greatly as a result of this shift of responsibility. The Ontario Department of Lands and Forests also recognized by the mid-1960's that silvicultural expertise had to be developed within a comprehensive management framework, in order to ensure sustained yield timber production. This was stressed in a 1967 study by the Brodie Study Unit. This recognition also led to the development of the Forest Production Policy (Refer to PART TWO, Chapter 1) and its approval by the government of Ontario in 1972. This policy provided direction for long-term timber production and spending of public funds for timber management, particularly regeneration.

Meanwhile, new problems had developed since the government had assumed responsibility for regeneration. The harvesting methods that were efficient and effective for the industry were causing difficulties for the government's regeneration efforts. The problems caused by the separation of harvesting and regeneration efforts were recognized by the government's Special Program Review of 1975 and the Armson Report: "Forest Management in Ontario" (1976).² Both of these reviews recommended that the forest products industry resume full responsibility for regeneration and retain their existing responsibility for harvesting.

A new means of negotiating and formalizing the specific responsibilities for timber management was developed during 1978 and 1979, when the Ministry of Natural Resources and the major pulp and paper companies agreed upon the development of Forest Management Agreements (FMA's). In 1979, The Crown Timber Act was amended to allow the Minister of Natural Resources to enter into these agreements with companies of the forest products industry. The general approach of the Forest Management Agreements is to provide the companies with the clear responsibility for the majority of the activities of timber management, through a negotiated agreement with the Minister of Natural Resources.

By December, 1985, 26 Forest Management Agreements had been signed, covering approximately 56 per cent of the Crown lands under timber licence in Ontario. The aim of MNR is to enter into these agreements with the majority of the large licence holders in the province. This would have the result of placing a total of about 70 per cent of the Crown lands licensed in the province under Forest Management Agreements about 243,000 square kilometres.

In 1975, The Environmental Assessment Act was passed and required compliance for all activities of the Ministry of Natural Resources, including timber management. This new legislation provided one further step in the continued development of MNR's approach to timber management on Crown lands.

Since that legislation was passed, timber management on Crown lands has proceeded under an interim exemption from the Act. This has been necessary while an approach for treating timber management activities was being prepared. Extensions to the Exemption Order over the past few years have been accompanied by binding conditions. Currently, the conditions require:

- (i) public consultation in the preparation and review of management plans;
- (ii) for proposals for primary forest access roads, consideration of alternative locations and their environmental implications; and
- (iii) public notice prior to the aerial spraying of herbicides and insecticides.

This Class Environmental Assessment describes a planning process for timber management which has evolved from the revision of MNR's existing timber management planning process, with the requirements of The Environmental Assessment Act taken fully into account. Once approved, that improved planning process will apply to all timber management planning on Crown lands in Ontario.

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2. PURPOSE OF THE UNDERTAKING

The purpose of the undertaking is to provide a continuous and predictable supply of wood for Ontario's forest products industry.

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3. DESCRIPTION OF THE UNDERTAKING

This chapter describes the activities which comprise the undertaking. It also describes where those activities can occur.

3.1 General Description

Timber management consists of the following sequence of related activities:

- (i) provision of access to harvestable timber;
- (ii) harvest of the timber for transport to wood-processing facilities;
- (iii) renewal of that timber resource, which involves:
 - a) preparing the site for regeneration;
 - b) regenerating the timber by natural or artificial means;
- (iv) maintenance of the timber resource, which involves:
 - a) tending operations to ensure successful growth of the new forest;
 - b) protection of the timber resource from insects and disease.

A fuller appreciation of the undertaking can be obtained by reference to PART ONE, Chapter 9, which contains a detailed description of these timber management activities.

The undertaking occurs on most of the forested parts of the province, excluding parts of southern, and all of southwestern Ontario. The undertaking occurs only on Crown lands, which have been designated as "forest management units". FIGURE 3.2-1 depicts the general outline of those management units. As described in PART TWO, timber management activities will be carried out on defined areas of those management units only.

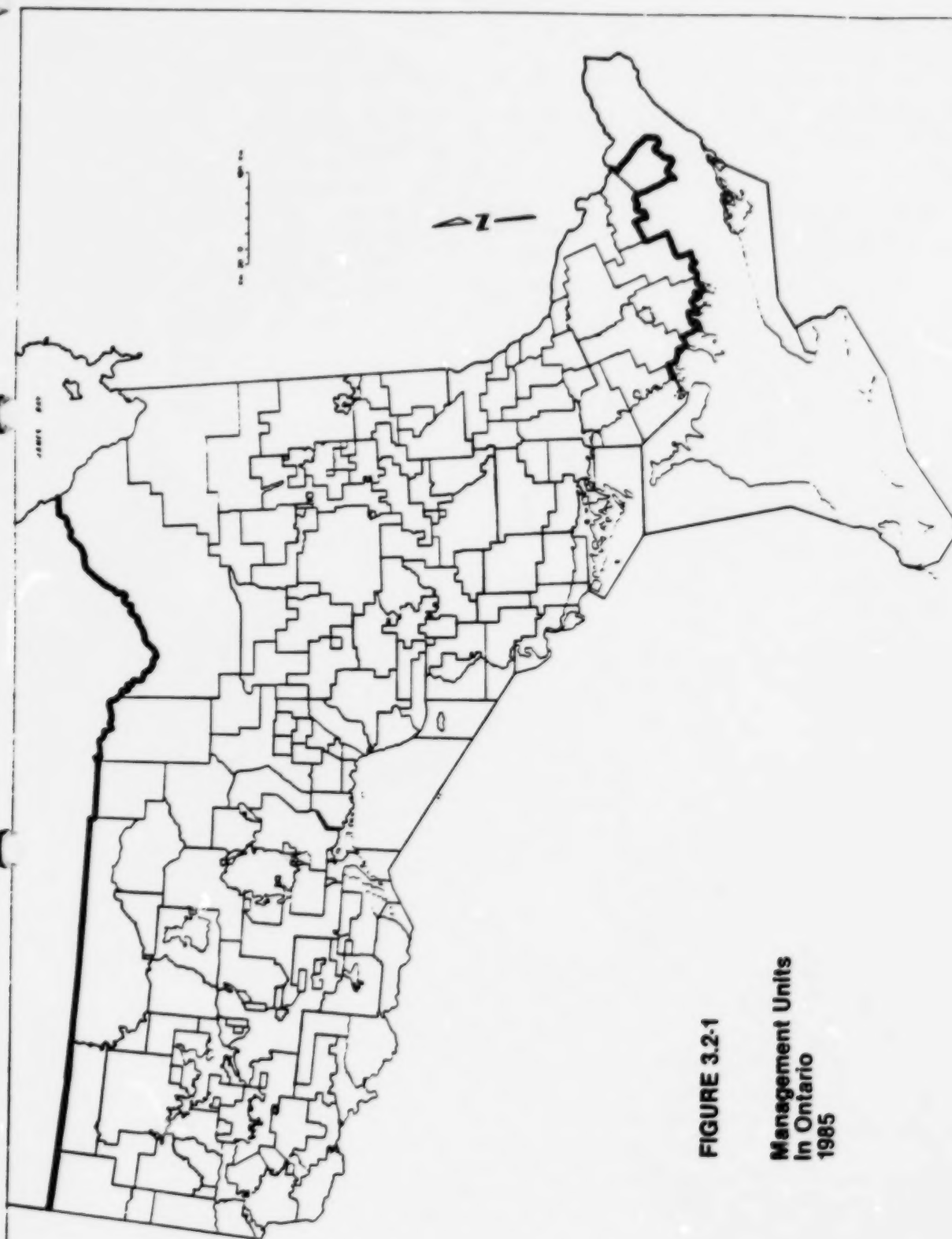


FIGURE 3.2-1
Management Units
In Ontario
1985

3.2 Management Units

As shown in FIGURE 3.2-1, the Crown lands upon which this undertaking occurs are subdivided for the purpose of timber management. These subdivisions, or "forest management units", are established by Order-in-Council pursuant to The Crown Timber Act. These management units may be of three types:

- i) Crown Management Units, where the Ministry of Natural Resources prepares Timber Management Plans and may carry out timber management operations itself. The Ministry may also contract operations to individuals or companies or issue short-term licences (up to five years) to companies which then carry out operations according to the approved plan prepared by MNR.
- ii) Company Managements Units are units licensed to large forest companies which play a greater role in timber management. The large companies have professional foresters on staff and are able to carry out the planning as well as some timber management operations. Planning, provision of access and harvest operations are all carried out by the companies; however, the Ministry will normally carry out the activities of renewal and maintenance (or contract these functions to individuals or companies).
- iii) Forest Management Agreement Forests (FMA's) are similar to Company Management Units, in that these management units are licensed to large companies. The major difference is that the companies are required, through negotiated agreements with the Minister of Natural Resources, to carry out the planning, and all operational aspects of timber management, except insect/disease pest control.

4. IMPLEMENTATION OF THE UNDERTAKING

4.1 General

The activities which comprise the undertaking of timber management can proceed only if they conform to the requirements of Timber Management Plans approved by MNR. A Timber Management Plan must be prepared for each management unit, following the planning process described in PART TWO, Chapter 2. Upon approval of the plan, the various activities that comprise timber management (i.e. access, harvest, renewal, and maintenance) can be implemented. These operational activities must comply with the specific requirements in each Timber Management Plan.

MNR maintains control and responsibility over the implementation of timber management through its approval of all Timber Management Plans for all types of management units. In all cases, approval must be granted by MNR's Regional Director and the Director, Timber Sales Branch, Forest Resources Group, Main Office. Authority for this control is granted through The Crown Timber Act which requires Timber Management Plans to be prepared, and operations to be carried out in accordance with those plans.

4.2 Timber Licences

Timber licences provide the authority to cut Crown timber. The licences are issued under the authority of The Crown Timber Act, and come in a variety of forms (Refer to APPENDIX VI). Regardless of the form of the licence, and regardless of who is granted the licence, all the activities must conform to a Timber Management Plan approved by MNR.

5. A CLASS ENVIRONMENTAL ASSESSMENT APPROACH

5.1 Justification

Interpretations of The Environmental Assessment Act have provided for the use of Class Environmental Assessments for common sets of activities. This approach is predicated on the basis that an acceptable planning process is developed in the Class Environmental Assessment for application whenever and wherever the undertaking is carried out.

Timber management is well-suited to this approach because it involves a common set of activities wherever practised. Although these activities are diverse, they are interrelated and all play a role in the achievement of the purpose of the undertaking. Although the individual activities of provision of access, harvest, renewal and maintenance are performed in different ways in different management units, certain characteristics are common to all locations:

- i) The activities which comprise the undertaking (access, harvest, renewal and maintenance) occur in every management unit, and are practised in a reasonably similar manner within each of two forest regions. The descriptions of timber management operations in PART ONE, Chapter 9 elaborate upon this point.
- ii) There are generally predictable ranges of environmental effects for each activity, as described in PART ONE, Chapter 11.
- iii) The optional methods of carrying out each activity, and the criteria for choosing the most appropriate method, can be identified.

In determining the appropriateness of the Class Environmental Assessment approach, the nature of the undertaking itself is also an important factor to be considered. Timber management is also an activity that does not have a completion point. Rather, this undertaking consists of a series of interrelated activities which are carried out on a continuous basis. In addition, the activities repeat themselves over a long-term cycle since it normally takes at least 80 years for a harvested forest to be regenerated to the point where harvest can once again take place.

There is also a dynamic nature to timber management, in that the decisions made for any specific activity, or the results of those decisions, may affect the options available for subsequent activities. For example, the decision on harvest techniques can affect the options available for regeneration, and the success of regeneration will determine requirements for maintenance. The undertaking is also subject to the effects of unpredictable events such as forest fires or insect infestations.

In recognition of all these facts, any approach to timber management must maintain enough flexibility to deal with the dynamic and sometimes unpredictable nature of timber management. Experience has shown that application of a common planning process to all management units is possible, and the Ministry contends that the consistency achieved by doing so is a vital asset. Application of a consistent process is the only way to ensure compatibility between management units across the province. Without this approach, it is virtually impossible for the Ministry to assess systematically what is occurring across the province, or to apply a reasonable level of control, to ensure the purpose of the undertaking is achieved. The common planning process also means a common, predictable and equal opportunity for public consultation in every management unit, and provides flexibility to deal with local conditions and concerns. This provides a level of fairness to all involved, as well as a manageable process for MNR, companies, and broad-based interest groups.

MNR has submitted a Class Environmental Assessment because it is the most appropriate vehicle for defining a common and consistent planning process, and for ensuring that the purpose of The Environmental Assessment Act is attained. Furthermore, the Class Environmental Assessment has the added advantage of allowing matters such as the purpose of the undertaking, the rationale for the undertaking, and alternatives to the undertaking, which are the same for all management units, to be dealt with on a generic basis.

The use of a Class Environmental Assessment, and application of a common planning process, will best meet the needs of MNR and the purpose of The Environmental Assessment Act in the majority of cases. However, the Ministry recognizes that there may be special situations in particular management units where this approach may not entirely satisfy all parties involved. Therefore, this

Class Environmental Assessment provides the opportunities for a "Bump-up" to an Individual Environmental Assessment in such cases (Refer to PART TWO, Section 2.3). The Minister of the Environment will have the authority to decide on whether a "Bump-up" is appropriate.

5.2 Time Frame

In submitting this Class Environmental Assessment, MNR is requesting that the approval of the environmental assessment remain in effect for at least six years. The first five years will allow complete phasing-in of the planning process to all management units. In the sixth year, MNR will review this Class Environmental Assessment in light of experience gained through its application. The purpose of this review will be to determine whether the Class Environmental Assessment remains appropriate, or whether specific changes to the document, or to the overall approach, are warranted. The Ministry will then submit its recommendations to the Minister of the Environment before the end of the sixth year. By the end of the sixth year, the Minister of the Environment will make the decision on whether the approval should be extended, amended or revoked.

6. ALTERNATIVES TO THE UNDERTAKING

6.1 Alternatives To

6.1.1 The "Do Nothing/Null" Alternative

The wood requirements of Ontario's forest products industry could be supplied from sources other than the province's Crown lands. Currently, some of industry's wood requirements are obtained from patented lands in Ontario; in 1978, for example, 19 per cent of the province's total roundwood production was obtained from patented lands. Greatly increased production from those patented lands could contribute, at least in part, to the achievement of the industry's wood requirements.

Assuming the availability of wood supplies with no or minimal market and institutional constraints, all or part of industry's wood requirements could also be imported from outside the province (e.g. from neighbouring provinces and/or the border states of the U.S.A.).

This alternative, which could be described as the "Do Nothing" or "Null" alternative, implies no use of the timber resources on the province's Crown lands to supply the continuous wood requirements of Ontario's forest products industry. Rather, each of the options previously described could supply those requirements independently, or perhaps more feasibly, in combination.

6.1.2 The "Harvest With No Renewal" Alternative

The wood requirements of Ontario's forest products industry could be supplied from the province's Crown lands without directing additional management efforts towards forest renewal. This alternative, which could be described as the "Harvest With No Renewal" alternative, would be entirely harvest and extraction-oriented. Renewal of the forest to supply the continuous wood requirements of the forest products industry would be left entirely to natural forces.

6.2 Recycling

While incapable of supplying a major portion of the raw material requirements of Ontario's forest products industry, recycling of previously-processed wood products provides a significant contribution towards the production of specific end-products - in particular, paper and cardboard. It is estimated that 35 to 40 per cent of previously-processed paper products used in Ontario are recycled. Because of the substantial export role of Ontario's pulp and paper industry, however, large volumes of post-consumer products are simply not available domestically for recycling in sufficient volumes to sustain the existing pulp and paper industry.

In the lumber and veneer industries, recycling is virtually a non-existent and impractical consideration as an alternative source of wood supply.

Recycling, therefore, while acknowledged as an important contribution to the raw material requirements of specific sectors of Ontario's forest products industry, is not considered as a reasonable "alternative to" for purposes of this environmental assessment.

7. THE UNDERTAKING AND "ALTERNATIVES TO": ADVANTAGES AND DISADVANTAGES

7.1 Evaluation

7.1.1 Timber Management

Timber management on Crown lands in Ontario provides a continuous and predictable supply of wood for Ontario's forest products industry. The industry manufactures a large variety of wood products for domestic needs and export markets, particularly in the U.S.A., and therefore makes a major contribution to the provincial economy. Statistics for 1983 indicate that the industry generated more than \$3 billion value added and provided approximately \$2.6 billion in export revenues.

Ontario's forest products industry provides approximately 80,000 jobs directly, and approximately the same number of jobs indirectly in support services and industries. The direct employment is provided in woods operations and more than 800 primary wood-processing facilities throughout the province. The forest products industry is the predominant base for industrial development in many parts of northern Ontario. Forest sector employment accounts for 45.1 per cent of total manufacturing employment in northern Ontario and 78.5 per cent in the economic region of northwestern Ontario. More than 20 northern Ontario communities are either entirely or predominantly dependent upon the forest industry for their economic well-being. For example, pulp and paper companies account for 40 to 60 per cent of all employment in the towns of Kapuskasing, Red Rock-Nipigon, Terrace Bay-Schreiber, Iroquois Falls, Marathon and Smooth Rock Falls.

The forest products industry is also the source of considerable revenues for both the provincial and federal governments. Statistics for 1981 indicate that the industry provided approximately \$262 million in direct provincial government revenues, primarily through stumpage and area charges, corporate income tax, personal income taxes of direct employees, and provincial retail sales taxes from direct employees and industry. The corresponding figure for direct federal government revenues is \$325 million.

Timber management is long-term, and is directed to ensuring a continuity of wood supply and economic stability for numerous communities which depend on the forest products industry as the primary industry and employer. Timber management generally aims to make production and harvest of the timber resource as efficient as possible. Increasingly, management efforts and expenditures are directed to sites with the greatest production potential and to the creation of new forests better structured to meet Ontario's future needs.

Government expenditures on comprehensive timber management planning, forest renewal, and proper implementation of timber management operations are sizable and long-term investments. Also, they are crucial in order to sustain and provide opportunities for the further development of the province's forest products industry.

Timber management operations potentially may cause a variety of environmental effects, which are described in PART ONE, Chapter 11. These effects may be positive or negative, short-term or long-term, direct or indirect, temporary or irreversible, cumulative and residual. Environmental effects are comprehensively addressed in the timber management planning process. Most effects can be prevented or minimized through proper planning and implementation of timber management operations, or mitigated through the use of remedial measures; some effects will have to be accepted as the inevitable consequences of the undertaking.

7.1.2 The "Do Nothing/Null" Alternative

This alternative would involve major implications to the forest products industry which is currently dependent on Crown lands for most of its wood requirements.

The option of importing all or part of the wood requirements of the forest products industry might sustain that part of the industry's manufacturing base which is required to process the province's domestic requirements for wood products. It would not, however, sustain production of wood products for export. In either case, it is highly likely that the existing market and institutional constraints on that importation could not be overcome. As a result, a major

portion of the manufacturing base of the industry which is devoted to the production of wood products for export would be eliminated.

The option of greatly increased production from patented lands could not be expected to independently sustain that part of the industry's manufacturing base which is required to process the province's domestic requirements for wood products, let alone contribute to the production of wood products for export. Productive forest on patented land comprises approximately 15 per cent of the total productive forest land of the province. Somewhat more than half of that forest is located in agriculturally developed southern Ontario and more than two-thirds is in the Great Lakes - St. Lawrence Forest Region. In northern Ontario, patented lands occur in the vicinity of a number of northern communities with a local agricultural industry, or as freehold land holdings of the railroad industry, and to a lesser extent, the forest products industry.

Less than 20 per cent of the patented land area of southern Ontario is forested, and not all of that land area can be considered to be productive. That limited land area could not be expected to supply the wood requirements of the forest products industry, even with much more intensive management efforts. Large-scale conversion of the limited agricultural land area of Ontario to intensive management of modern, fast-growing, highly productive, genetically-improved tree species is also not a practical alternative. Furthermore, much of Ontario's forest products industry is based on the tree species which are found in the Boreal Forest Region. The tree species of southern Ontario are not satisfactory for much of the forest products industry, nor could the boreal species be successfully produced in southern Ontario.

Realistically, a combination of this option and the wood importation option would be required. Again, however, it would be expected that a major portion of the manufacturing base of the forest products industry, which is devoted to the production of wood products for export, would be eliminated.

Each of the options within this alternative would have significant social and economic implications. For the wood importation option, significant negative social and economic implications would be involved, such as:

- substantial industry expenditures for the acquisition of roundwood raw material from outside the province; 1
- dependency on external sources of supply, with the associated supply and cost uncertainties; 2
- substantial expenditures for the transportation of roundwood raw material to existing wood-processing facilities closer to the roundwood supply base (i.e. Great Lakes shorelines, provincial borders, etc.) in order to minimize transportation costs; 3
- closure of many wood-processing facilities, particularly those in communities in the northern interior of the province, because wood acquisition and transportation costs would be prohibitive; 4
- loss of all jobs in the harvest and forest renewal sectors of the industry; 5
- loss of jobs in the wood-processing sector of the industry as well, where wood-processing facilities would be closed; 6
- loss of government revenues from stumpage and area charges, and from lost jobs; 7
- loss of sizable export revenues, with the associated increased expenditures for wood imports; and 8
- loss of the value of the capital assets of those wood-processing facilities which would be closed. 9

Most of the significant negative social and economic consequences associated with the wood importation option would also apply to the option of greatly increased production from patented lands as well. For some of those consequences, however, the severity and magnitude of the effects could be considered to be somewhat less (e.g. dependency on external sources of wood supply, transportation expenditures, industry relocation expenditures, loss of jobs in harvest and forest renewal sectors of the industry, and loss of government revenues from lost jobs). 10

While government expenditures under these options would be reduced, some incentives or subsidies to private landowners would be required. These expenditures would be directed, in particular, to nursery production of tree seedlings, reforestation assistance and professional consultation in the management of established timber crops. Also, in both cases, large government expenditures would be required to create and maintain jobs in communities 11

where forest products companies would fail, and to facilitate the re-structuring of the forest products industry.

The environmental effects of this alternative, and each option within it, would not be great. For the wood importation option, which implies no harvest or forest renewal activities within the province, obviously none of the environmental effects which are described in PART ONE, Chapter 11 would occur. For the option of greatly increased production from patented lands, essentially the environmental effects described in PART ONE, Chapter 11 would be displaced from Crown lands to patented lands. However, because patented lands could not be expected to supply independently the wood requirements of the forest products industry, the geographical extent of those environmental effects would be considerably smaller. The severity and magnitude of the effects, however, might be expected to be somewhat greater on those lands which would be affected, because of the greater intensity of timber management efforts which would be needed.

7.1.3 The "Harvest With No Renewal" Alternative

This alternative would involve major medium and long-term implications to the forest products industry. While the industry's wood requirements could be supplied for a considerable period of time (i.e. an estimated 80 to 100 years), the industry would become increasingly dependent on less productive, lower quality forests at greater distances from the wood-processing facilities. Ultimately, it would become increasingly difficult to maintain efficiency and, consequently, the competitiveness of the province's forest products industry in a highly competitive world forest industry. In short, neither government nor industry would have any control over the nature of the forests to supply future requirements.

Moreover, there would eventually be a shortfall in wood supply, particularly of desirable and valuable high quality tree species. Ultimately, the problems of wood supply, and more critically, accessible wood supply, would result in a considerable reduction of the forest products industry in the province, particularly in northern Ontario.

The social and economic benefits associated with "The Undertaking: Timber Management", as described in Section 7.1.1, could be expected to apply to this alternative as well, but only for a period of time. An exception would be in terms of employment, where no jobs would be available in the forest renewal sector of the industry. None of the substantial government expenditures associated with forest renewal would be incurred, but neither would the long-term economic benefits resulting from forest renewal efforts be realized.

However, as decreased efficiencies of production become an increasing concern, it would be expected that initially the reduction in competitiveness of the industry would detrimentally affect export sales, thereby reducing production for that market. This in turn would lead to a reduction of the industry itself, with significant social and economic consequences, such as:

- a reduced contribution to the provincial economy;
- reduced numbers of jobs;
- reduced government revenues;
- reduced export revenues;
- closure of some wood-processing facilities;
- major disruption and upheaval of several communities dependent on the forest products industry, particularly single-industry small communities in northern Ontario; and
- loss of the sizable value of the capital assets of those wood-processing facilities which would be closed.

Ultimately, the limited wood supply situation would result in a major reduction of the industry, compounding the kinds of social and economic consequences previously described. Large government expenditures would be required to create and maintain jobs in communities where forest products companies would fail. The inability of the industry to supply even the province's domestic requirements for wood products could eventually become a reality, resulting in major expenditures for the acquisition of manufactured wood products from outside the province.

Since operations would be entirely oriented to harvest and extraction, the environmental effects associated with the provision of access and harvest

operation for "The Undertaking: Timber Management", as described in PART ONE, Chapter 11, would also be expected to occur. While none of the negative effects which are described in PART ONE, Chapter 11 for forest renewal and maintenance operations would occur, the positive effects of management efforts to assist in re-establishment of forests on harvested lands, particularly to encourage desirable and valuable high quality tree species, would also not occur.

Ultimately, as operations extend into forests farther and farther from the wood-processing facilities, and as less productive, lower quality forests become critical sources of wood supply, the extent, severity and magnitude of most of the negative environmental effects of operations could be expected to increase substantially.

7.2 Comparison

Table 7.2-1 presents a relative comparison of "The Undertaking: Timber Management" and the "Alternatives To", according to a number of criteria.

TABLE 7.2-1
SUMMARY COMPARISON OF "UNDERTAKING: TIMBER MANAGEMENT" AND "ALTERNATIVES TO"

CRITERIA	"TIMBER MANAGEMENT"	"DO NOTHING/NULL"		"HARVEST WITH NO RENEWAL"
		Wood Importation	Increased Production From Patented Lands	
Wood Supply Source	Supply continuous and predictable	Supply limited and unreliable	Supply limited because of land base	Supply increasingly more unpredictable and limited over time
ECONOMIC IMPLICATIONS (a) contribution to provincial economy (b) export revenues (c) government revenues (d) government expenditures	Major contribution	Limited contribution	Limited contribution	Major contribution now; decreasing over time
	Major contribution	None	Very limited	Major contribution initially; declining over time
	Significant contribution	Very limited	Limited	Significant; declining over time
	Significant investment requirement	Significant expenditures for community maintenance and to facilitate restructuring of industry	Significant expenditures for community maintenance and to facilitate restructuring of industry	Limited initially; increasing over time
SOCIAL IMPLICATIONS (a) employment opportunities (b) stability of industry and dependent communities	Major source; critical in N. Ontario	Major reduction and geographical displacement	Significant reduction in areas where Crown lands predominate	Major contribution now; declining over time
	Major stabilizing force; critical in N. Ontario	Major disruptions, particularly in N. Ontario	Disruptions would occur; most significant where patented lands are limited	Significant stabilizing force now; declining over time
ENVIRONMENTAL IMPLICATIONS	Acceptable, with proper planning and implementation	Few, if any	Significant impacts on relatively small areas	Unacceptable

8. RATIONALE FOR THE UNDERTAKING

PART ONE, Chapter 7 presents an analysis of alternative ways of achieving the purpose described in PART ONE, Chapter 2. Based on this analysis, the Ministry has concluded that "The Undertaking: Timber Management" is the best way of achieving the purpose. In addition, the undertaking has advantages which the alternatives do not provide.

The province of Ontario is fortunate to have available, under the ownership of the Crown, a vast area of land presently supporting, and capable of producing in perpetuity, a renewable timber resource. In particular, much of Ontario's timber resource consists of high-quality coniferous wood fibre for pulp and paper production, offering Ontario a considerable competitive advantage in the lucrative export market of the U.S.A.

As described in PART ONE, Section 7.1.1., the forest products industry is vital to the economic and social well-being of the province, in particular northern Ontario with its numerous forest industry-dependent communities. The industry makes a major contribution to the provincial and national economy, generating substantial export earnings and offering the potential for considerably more. The industry supplies large taxation revenues for government, and provides well-paid employment for large numbers of people directly in the industry and indirectly in support services and industries.

Industrial demand for wood is expected to continue to increase. In particular, demand for high-quality wood fibre for the pulp and paper industry from Ontario's Boreal Forest Region can be expected to increase. Moreover, export demands from countries with inadequate timber resources can be expected to increase substantially, despite the rapidly increasing competition from South America and the southern U.S.A., with their more favourable climate and faster-growing high-quality tree species.

At the same time, the land area in Ontario available for production of required wood supplies is finite and increasingly remote. In fact, that land area is decreasing, as demands for other uses on those lands remove land from timber production. Therefore, increased production is required from available lands,

particularly the most productive and accessible lands, necessitating increased management efforts and stewardship to ensure a continuous supply of raw material.

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9. ALTERNATIVE METHODS OF CARRYING OUT THE UNDERTAKING

9.1 General

As described in PART ONE, Chapter 2, the undertaking of timber management consists of the following sequence of activities:

- (i) provision of access to the timber resource;
- (ii) harvest of the timber;
- (iii) renewal of the timber resource (i.e. site preparation and regeneration); and
- (iv) maintenance of the timber resource (i.e. tending and protection).

This chapter describes the various methods available and in use in Ontario to carry out each activity. As is evident in the following descriptions, the choice of method(s) for any one activity often will be linked to the method chosen for another of the activities.

In the preparation of a Timber Management Plan, this choice between alternative methods is based on a combination of considerations such as:

- the characteristics of the forest (Refer to PART ONE, Chapter 10 for a description of forest regions);
- the site conditions, such as soil type and depth, slope and drainage;
- relative costs of alternative methods; and
- interests and concerns of other users of the forest.

9.2 Provision of Access

Access to the timber resource is needed:

- (i) to transport personnel and equipment required to harvest and renew the timber; and
- (ii) to transport raw wood (logs, poles and chips) from the management unit to wood-processing facilities.

In Ontario, most access is provided by road because it is most cost-effective and provides the greatest degree of flexibility. Rail, water and aircraft are

occasionally used, but to a limited extent, or to carry out only very specific functions. A description of each of these alternative methods for the provision of access is presented in the following discussion.

9.2.1 Roads

Roads are the most commonly used form of access to the timber resources on Crown lands in the province. More than 80 per cent of wood transport is by road, and personnel and equipment are almost totally transported by road. There has been a shift to road use from water and rail over the past 30 years - a trend that is very likely to continue.

Access roads are constructed and maintained to various standards, primarily recognizing the longevity and intensity of their use. The roads used in timber management are classified as **primary, secondary and tertiary roads**.

Primary roads are constructed, maintained and used as the main all-weather road system providing access to the management unit as a whole. They are used continuously and frequently, for the transport of personnel and equipment to and within the management unit for harvest operations and subsequent renewal activities, and for the transport of wood from the management unit to the wood-processing facilities. They are essentially permanent roads, regularly maintained, with an expected life in excess of 10 years.

Secondary roads are designed for use as all-weather access for a period of five to 15 years. They are essentially branches off primary roads, providing access to areas of operations within a management unit. These roads are not considered permanent, and are not normally maintained beyond the five to 15-year period of their use.

Tertiary roads are built for short-term use (up to five years). Usually, these roads provide access for an annual harvest, and any subsequent renewal activities. These roads may be thinly surfaced or unsurfaced and are not maintained beyond the period of their use; normally, they are reforested.

9.2.2 Rail

Rail transport currently is used almost solely to transport wood from management units to wood-processing facilities, and accounts for approximately 15 per cent of total wood transportation. Personnel and equipment are rarely transported to management units by rail.

Railway lines may provide a permanent system of access to the management unit as a whole, but unlike roads, they are not used to gain access to the actual area of operations within the management unit. Where rail access is used, it is always in conjunction with road access; wood is invariably brought by roads to the rail siding for transport to the wood-processing facilities.

No new railways are likely to be constructed in the future solely for the purpose of timber management.

9.2.3 Water

As is the case for rail transport, waterways are used only for the transport of wood from management units to wood-processing facilities. The use of waterways associated with timber management has slipped from its prominence of 50 years ago, when 80 per cent of harvested wood was moved by water, to a present day share of five per cent of the total wood movements in the province. Personnel and equipment are rarely, if ever, transported to or from management units by water.

Waterways normally provide access only on a seasonal basis, since lake access is limited by winter ice conditions, and rivers may have low summer flows which limit their use.

As in the case of rail access, water is not used to gain access to the areas of operations within the management unit. Where water access is used, wood is brought by roads to the waterway for transport to wood-processing facilities.

9.2.4 Air

Fixed-wing, helicopter or balloon aircraft are not used to transport wood in Ontario, nor are these methods likely to be used in future. Ontario has few insurmountable topographical features which would require aircraft for the transportation of wood.

Aircraft may be used to transport personnel on a daily commuter basis to remote operations where no supporting camp facilities exist. Since a road system is normally in place, and air transportation is normally much more expensive, personnel, equipment, and supplies normally do not move by air.

The one activity that commonly uses aircraft (fixed wing and helicopters) is that of maintenance, notably in the aerial application of herbicides for tending purposes and insecticides for protection of the timber resource. To accommodate takeoff and landing within the management unit, airstrips are usually constructed by widening existing access roads.

9.3 Harvest

9.3.1 General

There are three broad alternative methods used to harvest timber in Ontario: clear cut, shelterwood cut, or selection cut. The choice of a particular method in a particular area will be determined by weighing a number of factors during timber management planning, including:

- objectives of management;
- the general conditions of the forest region;
- the site conditions (soil, topography, climate);
- the existing condition (age and quality) of the timber resource;
- the species of trees and the mix of species;
- values of concern to other users/uses of the forest; and
- economics.

The selection of a method of harvest usually includes a decision as to what method of renewal will be used. As is evident in the discussion which follows, each method of harvest provides options for only a narrow range of renewal methods. In fact, in most harvest methods, it is the type of renewal desired (or best suited to the species and site) that will determine the choice of harvest method. This systematic approach to timber management usually goes a step further, to the stage of maintenance (i.e. tending and protection). When all three activities of harvest, renewal and maintenance are considered together, one refers to the complete package as a silvicultural system.

Before describing the harvesting methods within each of these silvicultural systems, a discussion of the three different logging systems used in Ontario might be useful.

- (i) In the **shortwood logging system**, eight or 16-foot logs are delivered to the roadside for transportation. The operations of felling, topping, limbing, skidding, and slashing to length are performed between the location of the stumps and the roadside loading of the wood. Approximately 15 per cent of the province's annual harvest is undertaken using this logging system.
- (ii) Seventy per cent of the province's annual harvest is carried out using a **tree length logging system**. The operations of felling, limbing, topping, and skidding are performed between the stump location and the roadside. Wood may then be loaded and hauled as tree lengths or further processed at the roadside into preferred lengths before hauling.
- (iii) The **full tree logging system** supplies the full tree, including limbs and tops, to the roadside for further processing into tree lengths or shorter lengths. The operations of felling and skidding are performed between the stump location and the roadside. Topping and limbing can take place at the roadside and the wood hauled as tree lengths, or the wood may be slashed to preferred lengths and then hauled. Occasionally, no topping, limbing or slashing takes place; the wood is

simply hauled as full trees. Approximately 15 per cent of Ontario's annual harvest is undertaken using this logging system.

After trees are cut, they must be moved from the stump location to roadside areas (landings) where they are usually concentrated into piles before loading on trucks. The trees may be physically dragged to the road (skidding) or picked up from the ground and moved (forwarding).

9.3.2 The Clear Cut Silvicultural System

The clear cut silvicultural system is the most common of the three silvicultural systems in use in the Boreal Forest Region. It involves the harvest of all or most of an area of forest in one operation. This technique provides the conditions necessary for the establishment and survival of new trees by means of natural or artificial regeneration. Clear cuts are used where the species to be regenerated can grow in the condition of full sunlight following clear cut, and where species will grow well in stands of even-aged trees. The major coniferous tree species of the Boreal Forest Region grow well in the exposed conditions created by clear cutting.

This system is less commonly used in the Great Lakes - St. Lawrence Forest Region, where fewer species require the high exposure to light created by clear cuts. Clear cuts are occasionally used in this forest region for the management of sugar maple. If the existing stand is of poor quality, it may be removed in one cut. Seedlings and saplings have already been established in the heavy shade under the full canopy, and will grow rapidly in the full sunlight which follows clear cutting.

Clear cuts can be of various shapes and sizes and can be characterized as:

- open clear cuts;
- strip and block clear cuts;
- seed tree clear cuts; and
- partial clear cuts.

Open clear cuts are often the result of the progressive cutting of several even-aged stands over a wide area. These cuts are most often irregular in shape and

broken by topography and non-commercial or immature stands. Clear cutting of this nature requires that the site be environmentally stable (i.e. soils are generally more than 30 cm deep, and slopes are generally less than 10 per cent). Open clear cuts may also be planned to fit around areas of value to other users of the forest. This means that parts of stands will not be cut (or will be cut in a modified manner) in order to protect certain identified values, such as wildlife cover, fisheries, water quality, bird nesting areas, fragile sites, tourism values and cultural features.

Strip and block clear cuts involve cutting in strip or checkerboard patterns that alternate between clear-cut portions and uncut portions. After five to 10 years, when the clear cut portions have suitably regenerated, operators return to the area to cut the uncut portions.

Seed tree clear cuts are used only with species that will regenerate well by natural seedfall, such as black and white spruce. A seed tree clear cut involves removal of all trees over an area with the exception of either individual seed trees or a series of seed tree patches.

Partial clear cuts occur when only certain commercially-desired species are removed from a mixed-wood stand. This may mean that the conifers are cut in patches from a stand, leaving the non-desired species (e.g., aspen, white birch, cedar and tamarack). Normally, cutting of this nature is confined to stands that contain at least 40 per cent commercial species. Stands containing a smaller component of commercially-desired species will probably not be worthwhile to harvest and are not cut.

The clear cut harvest system may involve any of the three logging systems in use in the province, the most common being the tree length system. Cutting may occur through use of chainsaws or mechanical fellers, and the trees or logs may be moved to landings by mechanical skidders or forwarders.

9.3.3 The Shelterwood Silvicultural System

The shelterwood silvicultural system is most commonly applied in yellow birch and white and red pine forests, or in even-aged sugar maple forests in the Great

Lakes - St. Lawrence Forest Region. Approximately five per cent of Ontario's annual harvest is produced under this system of timber management.

The application of the shelterwood system may involve as many as three separate cuttings conducted in the following order:

- preparatory cuttings, which ready the site for regeneration;
- seed cuttings, which allow regeneration to become established; and
- removal cutting(s), which offer the young crop space and light for growth.

Natural regeneration requires that there be a seed source. Not all stands are in a state that allows them to produce adequate amounts of seed for successful regeneration. Preparatory cuttings may remove some of the trees of poor commercial quality from the main stand. This first cut may also clear the understory of poor quality saplings and competitive shrubs. Only enough openings are needed to allow the seed trees to enlarge their crowns and receive adequate sunlight to stimulate seed production.

The seed cutting is the stage at which the major cutting takes place. The stand is opened to a point where natural regeneration will take place under the shelter of the seed trees. All trees that are unnecessary to the seeding or sheltering of the new seedlings are removed; these trees provide the timber which yields the revenue necessary for the operation. Natural regeneration in the shelterwood system is commonly augmented by planting or artificial seeding.

There are two forms of the shelterwood silvicultural system currently in use. The **uniform shelterwood system** involves the application of the cuttings over an entire stand or area. The shelter trees are uniformly dispersed over the cutting area as the seed source for natural regeneration. The **strip shelterwood system** includes the application of usually three or more cuttings, but in strips. It is likely that each strip would be no wider than twice the height of the crop trees. Over time, all strips would be cut and the regeneration would be cut in a series of even-aged strips spaced throughout the managed area.

The moderate intensity of the harvest, the relatively small size of the areas which are harvested, and the risk of logging damage to residual trees dictate the use of

small machines and the extraction of the wood in tree lengths or as shortwood. Harvesting may be restricted to the winter season in order to use snow cover to help protect seedlings and saplings from skidding damage. The most common logging system currently in use is the tree length system using chainsaws and a conventional skidder.

9.3.4 The Selection Silvicultural System

The selection silvicultural system is most commonly used in uneven-aged tolerant hardwood forests of the Great Lakes - St. Lawrence Forest Region.

Approximately 10 per cent of Ontario's annual harvest is produced under the selection system of forest management.

Harvest operations in the selection system involve the selection of trees by marking and then removing them, either as individuals or in small groups, at regular intervals and repeated indefinitely. Intervals between cuts may be from 10 to 20 years. This type of harvest ensures the perpetual continuation of an uneven-aged forest.

The moderate intensity of the harvest, and the risk of logging damage to residual trees, dictate the use of relatively small equipment and the extraction of the wood in tree lengths or as shortwood. The most common logging system currently in use is the tree length system using chainsaws and a conventional skidder.

9.4 Renewal

Renewal of the timber resource may occur in one of three ways following harvesting: (i) the area may be left to regenerate naturally; (ii) the area may receive a site preparation treatment to facilitate regeneration of certain species naturally; and (iii) the area may be regenerated by seeding or planting, with or without prior site preparation.

9.4.1 Site Preparation

If a harvested area does not provide a suitable environment for a seed or tree seedling to grow, the area may be prepared so that this environment is improved.

When a site is to be regenerated by seeding, the environment must be conducive to germination and root penetration. Moist sphagnum moss seedbeds usually do not require any preparation; these sites will support germination and growth as they are. On drier sites, site preparation will remove duff layers and expose a mineral soil seedbed to assist the germination and survival of new seedlings. A good seedbed provides enough moisture to soften the coat of a seed and allow germination, and then allows the developing root system to take up moisture through the complete growing season.

Most areas that are to be planted will undergo some form of site preparation. Site preparation achieves three purposes: (i) it aligns the debris left after logging, which makes it easier for tree planters to walk and to identify planting spots; (ii) it reduces the presence of competing vegetation from the planting spots; and (iii) it removes the layer of organic matter from the mineral soil.

There are three different forms of site preparation in use: mechanical, chemical, and prescribed burning. While each has its particular value to certain sites and species, the mechanical method is the most commonly used.

Mechanical site preparation involves the use of tracked or wheeled machines to drag or push various attachments which are designed to expose mineral soil and reduce existing vegetation. These attachments include front-mounted blades and teeth, which may be used year-round, and rear-mounted drags consisting of barrels, pads, chains, ploughs and patch scarifiers, which are generally used during the frost-free period. Ninety per cent of the province's mechanical site preparation effort is in the Boreal Forest Region.

Some sites may support many species of shrubs and undesirable trees that, if left alone, will not allow desirable species to establish themselves. Mechanical site preparation alone is usually not adequate to control the competition for

sufficient time to allow the new regeneration to become established; normally, more vigorous site preparation techniques are required. These techniques include chemical site preparation and prescribed burning.

Chemical site preparation involves the application of herbicides to control other vegetation that would impair the establishment and survival of desired tree seedlings. Registered and approved chemicals may be applied by hand pressure sprayers, tractor-mounted boom sprayers, or by aircraft. The chemicals may be applied before, during or immediately after the regeneration operation. To date, this form of site preparation has not been common in Ontario.

Prescribed burning involves the controlled use of fire on a designated area. The objectives of the burn are to reduce vegetation and/or logging debris remaining after harvest, and to prepare a suitable site for natural or artificial regeneration. The use of prescribed burning is almost totally restricted to the clear cut silvicultural system in the Boreal Forest Region, where in the past it has accounted for approximately 10 per cent of the site preparation program. Mechanical site preparation may also be used as a follow-up treatment.

Prescribed burning requires care in planning and execution in order that the fire may be properly controlled. Burns will not be conducted if there is a risk of the fire expanding, or if there are not sufficient staff or equipment to maintain control. An alternative and more costly treatment, such as chemical or heavy mechanical site preparation, may have to be used if the burn cannot be conducted.

9.4.2 Regeneration

Regeneration of the forest occurs naturally, either from seeds, from root suckers (e.g. aspen), or as shoots (coppice) from stumps or damaged stems of trees. Seed may come from standing trees or the crowns of trees left on the ground following harvesting. Alternatively, regeneration may occur artificially, by planting seeds or tree seedlings.

In certain forests, seedlings, saplings and young trees may already be present prior to harvest. Depending on the objectives of management, the species present and other conditions, the harvest method used in these situations may be chosen so that regeneration will develop from this already well-established source. This procedure is common in the management of sugar maple in the Great Lakes - St. Lawrence Forest Region.

The decision of whether to rely on natural or artificial regeneration is based on many factors, such as management objectives, nature and location of the area to be treated, availability of seed sources (either for natural or artificial regeneration), and availability of planting stock. The costs vary considerably, and generally are least for natural regeneration and greatest for artificial regeneration.

Approximately 40 per cent of the artificial regeneration in Ontario involves planting of tree seedlings, either by hand or by machine. The seedlings may be bareroot or container stock. The container stock, which is grown in a peat plug, usually takes less time to produce, is the smaller of the two types, and is used where competition is minor. Planting is the most expensive regeneration method. Approximately 90 per cent of Ontario's planting is undertaken by hand on areas that have been site prepared. All mechanized planters that currently exist are adapted to the planting of fields and do not work well in the wildland conditions of northern Ontario.

9.5 Maintenance

Maintenance operations include the activities of tending and protection from insects/disease. Maintenance operations are carried out to ensure the survival and development to maturity of the established forest crop.

9.5.1 Tending

Tending refers to any operation carried out to improve growth or quality of a forest crop at any stage of its life. It may consist of cleaning, thinning or improvement treatments. The most common tending operation in Ontario's

forests is the removal of undesirable vegetation by mechanical or chemical means. These operations are referred to as "cleaning".

Mechanical cleaning involves cutting unwanted trees or shrubs with axes, brush-hooks, powered saws or by girdling. Girdling involves encircling the stem with a cut in order to halt the flow of water and nutrients from the roots to the leaves, thereby killing the tree.

Herbicides are used to kill or reduce the growth of competing vegetation in order to improve the survival and growth of the crop species - usually conifers. Herbicides may be applied from the ground or air; aerial application is the most common method.

Stand improvement is a tending activity which is normally practised in older stands. Stand improvement is usually restricted to thinning, or removing undesirable trees from a stand to encourage the growth and development of the remaining stand. Commercial thinnings are conducted when the trees that are removed are of saleable size and generate income that is greater than the cost of conducting the operation. Thinning is coming into greater use as the managed plantations of northern Ontario are becoming old enough to warrant this type of treatment.

There has been experimental use of several other methods of tending the timber resource, but none of these have been used on a regular basis. These methods include: applying fertilizer by aircraft, hand, or machine; draining wet sites through excavation of ditches; and cultivating, or plowing, to remove competing vegetation.

9.5.2 Protection

The other component of maintenance of the timber resource is protection of the resource from pests, including disease and insects.

Disease control is practised rarely, usually involving the cutting and burning or burying of infected trees. The hand application of chemicals to freshly cut

stumps to reduce the incidence of a root disease in plantations is a common practice in the Great Lakes-St. Lawrence Forest Region. Insect control is undertaken periodically and selectively, normally if an epidemic is threatening or if an insect infestation is expanding significantly.

A certain amount of insect and disease control may be achieved by reacting quickly to the normal deterioration of stands by salvaging damaged timber before natural processes take over. Windthrown stands should be harvested before boring insects make the wood useless for lumber, or before secondary fungus infections can get established.

By policy, all Ministry of Natural Resources personnel who apply pesticides must be licensed as exterminators by the Ministry of the Environment. Only aerial spraying companies licensed under The Ontario Pesticides Act and represented at the most recent MNR Training Course for Aerial Applicators are eligible to bid on MNR projects for aerial application of pesticides.

The intent of pesticide application in Ontario's forests is to control forest pests when they are out-competing desired tree species or in stages of high or epidemic populations. Pesticides are not intended to eliminate forest pests. They provide control of populations long enough to allow the desired tree species to grow unimpeded and to compete for the resources of sunlight and nutrients. Forest pests usually persist as natural components of forest ecology, but after treatment they compete from a subordinate position.

9.6 Renewal and Maintenance For Different Silvicultural Systems

As discussed in PART ONE, Section 9.3, the three silvicultural systems practised in Ontario provide a co-ordinated approach to the harvest and renewal of the timber resource. Harvest methods for each system have been described in Section 9.3. This section elaborates on that discussion by describing the particular methods of renewal and maintenance which are applied with each silvicultural system.

9.6.1 The Clear Cut Silvicultural System

The regeneration of open clear cuts may be by natural or artificial methods. Natural regeneration may be achieved from seeds or cones that are scattered

about during harvest (e.g. jack pine) or from seed from nearby standing trees (e.g. black spruce), from coppice regeneration (e.g. trembling aspen, white birch), or from seedlings established prior to harvest (e.g. maple). Artificial regeneration occurs on approximately 60 per cent of all clear cuts, and is undertaken through seeding by aerial or ground techniques (e.g. jack pine), or by planting. To increase the probability of success in regeneration, normally some form of site preparation would be used prior to seeding or planting. This might mean mechanical or chemical site preparation, or it could be prescribed burning.

The other variations on the clear cut system are designed to maximize natural regeneration by leaving seed sources in the remaining strips, blocks, or individual trees. In these cases, some seeding or planting may also be used to augment the natural regeneration. In addition, seeding or planting may take place several years later, if the site has not yet regenerated sufficiently.

Tending may occur in the new forests following clear cutting and subsequent regeneration. Later on in the development of the forest, some stand improvement work may occur, normally in the form of thinning.

Protection of the timber resource from outbreaks of disease and insects may also be carried out.

9.6.2 The Shelterwood Silvicultural System

In the shelterwood silvicultural system, soil disturbance during harvest operations normally is sufficient to ensure the successful germination and establishment of tree seedlings, thereby negating the requirement for site preparation. However, the successful establishment of a forest crop in this system may require some form of site preparation, particularly for those species most commonly managed under this system. Where the seedbed is not exposed sufficiently for the successful regeneration of the desired species, mechanical site preparation may be carried out. Light equipment is used to prepare the seedbed for natural regeneration from the standing seed source left during the initial

harvest operation. Chemical site preparation may be carried out, usually following mechanical site preparation, in order to control the advance reproduction of undesirable competing vegetation or tree species. This technique is most commonly used in the regeneration of white pine.

Prescribed burning is not extensively used as a site preparation technique in the shelterwood silvicultural system. It may be carried out in the regeneration of white and red pine, often using several successive burns to achieve the desired control.

The shelterwood silvicultural system is essentially designed to provide the conditions necessary for natural regeneration through the simple regeneration of a seed source and cover; artificial regeneration is very rarely practised. Occasionally, natural means of regeneration are not totally successful. In such cases, artificial regeneration by seeding or planting may be required.

A certain amount of tending takes place under the shelterwood system. Removal of undesirable deciduous species is normally limited to manual methods. Herbicides can be used to control vegetation in conifer regeneration. Stand improvement operations are carried out in the shelterwood silvicultural system to remove unwanted trees that were not taken during harvest operations or undesirable trees that suppress the desired crop trees during stand development.

Pruning is occasionally carried out, particularly to improve the production of knot-free lumber in white pine. Pruning requires the removal of unproductive branches to allow growth over knots and the production of clear wood in the lower part of the stem of the tree. This operation is highly labour-intensive and occurs only on high quality trees destined for large sawlog or veneer production.

A variety of insect pests such as sawflies, weevils and moths which affect forests of the Great Lakes - St. Lawrence Forest Region may be controlled using registered and approved insecticides. Infestations are periodic and therefore are controlled as conditions warrant.

9.6.3 The Selection Silvicultural System

Site preparation techniques are normally impractical and undesirable in forest stands harvested under the selection silvicultural system, since there are many trees of varied ages left after harvest. Site preparation is not normally required, and therefore, seldom used. If the group selection variation of the system is used, site preparation may be carried out but only with small tractors or skidders.

Renewal of the timber resource in the selection silvicultural system is generally accomplished entirely by natural means. The young seedlings and saplings exist in such numbers on the floor of the tolerant hardwood forests of the Great Lakes - St. Lawrence Forest Region that natural regeneration can be assured.

The only tending activity that occurs on a regular basis under the selection silvicultural system is that of stand improvement. Generally, stand improvement activities are conducted during the regular harvest of a stand that is managed under the selection silvicultural system. In fact, improvement may be thought of as part of the harvest activity. Trees that are considered to be undesirable in the stand may be removed along with the crop trees, and may even be sold as fuelwood, thus contributing to the revenue of the harvest. Undesirable trees include those with defects, trees of species that are not suited to the site or the selection silvicultural system, and shrub species. Trees may be removed by cutting or girdling; however, cutting is favoured.

A variety of insect pests such as sawflies, weevils and moths which affect forests of the Great Lakes - St. Lawrence Forest Region may be controlled using registered and approved insecticides. Infestations are cyclical and therefore are controlled periodically as conditions warrant. In the selection silvicultural system, pest control operations are carried out infrequently.

10. DESCRIPTION OF THE ENVIRONMENT AFFECTED

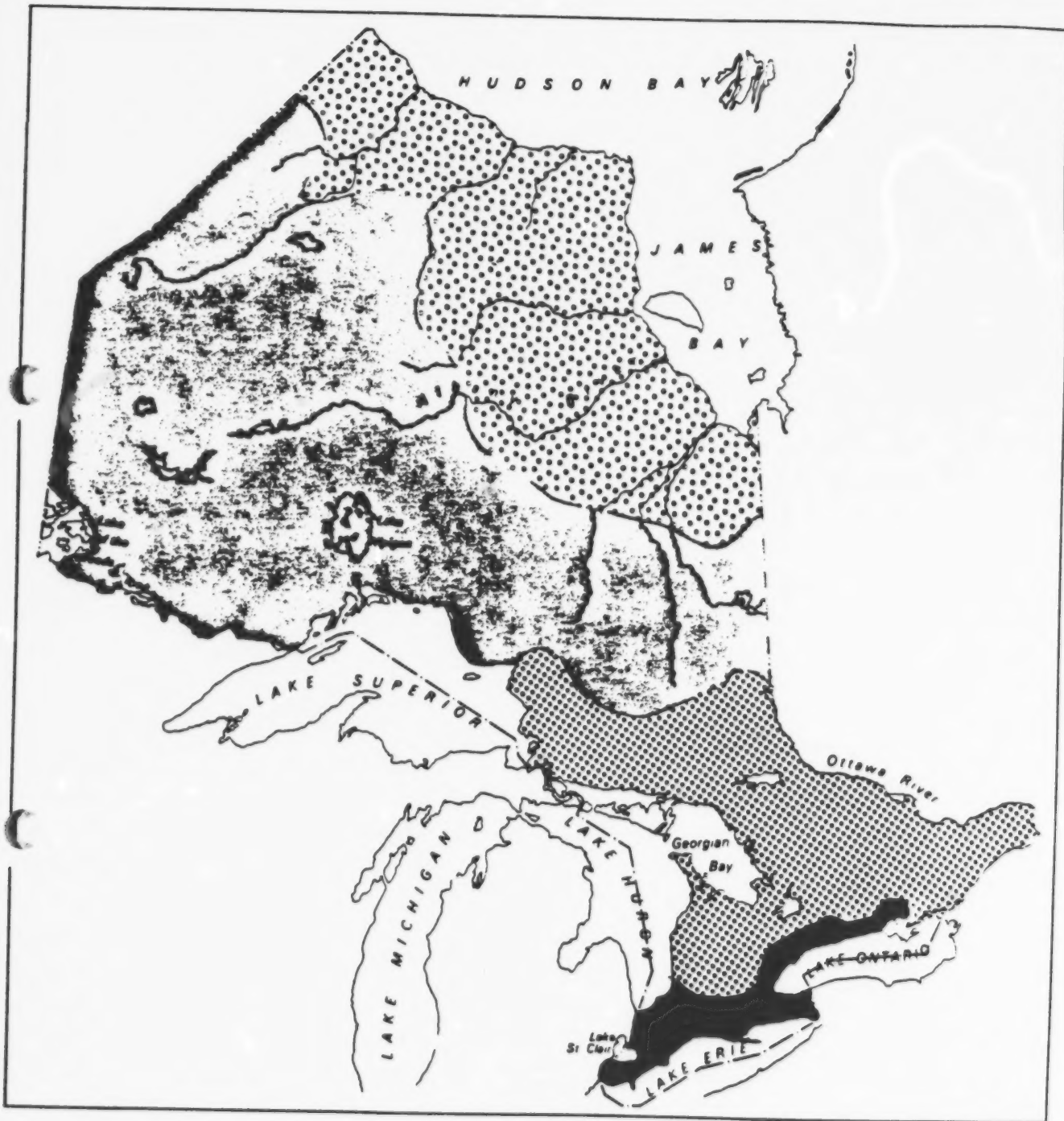
The undertaking is carried out on more than half of the land area of Ontario. This area is diverse in terms of its physical features, its forest cover, and its general flora and fauna.

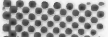
The Ministry takes the position that, in a Class Environmental Assessment, the description of the environment affected need not be detailed, but must identify, in a general way, those components of the environment which are likely to be affected by the undertaking.

A detailed description of the environment affected in any particular management unit is a requirement of the timber management planning process, as described in PART TWO, Chapter 2. The first step in that planning process requires the assembly of a comprehensive environmental data base for the management unit. That environmental data base will include information on natural resources such as soils, forest resources, mineral resources, fish and wildlife resources, and recreational resources, as well as existing land uses. Over time, as new Timber Management Plans are prepared for each management unit, a comprehensive and regularly-updated data base will be assembled. When examined collectively, the data bases for individual management units represent a data base for the entire area of Crown lands of the province on which timber management takes place. The data base will permit the prediction of the actual effects of timber management operations to be carried out in a management unit on the environment of that management unit.

When considering the environment affected by the undertaking, it is essential to recognize that the undertaking involves management of a part of the environment itself - the timber resource. J.S. Rowe's Forest Regions of Canada³ provides a description of the two forest regions of Ontario within which the undertaking is carried out. Those regions are the Boreal Forest Region and the Great Lakes - St. Lawrence Forest Region. FIGURE 10.1-1 depicts the geographical extent of those forest regions in the province.

FIGURE 10.1-1
The Forest Regions of Ontario



-  Boreal Forest
-  Predominantly Forest
-  Forest & Barren
-  Great Lakes - St. Lawrence Forest
-  Deciduous Forest

The Boreal Forest Region constitutes the greater part of the forested area of Northern Ontario. The Boreal Forest Region is primarily coniferous, with a general mixture of deciduous trees. The principal tree species are white and black spruce, balsam fir, jack pine, trembling aspen, and white birch. Minor species include tamarack, white cedar, red pine, white pine and black ash.

The Boreal Forest Region of Ontario is subdivided into a number of sections. The geographical limits of the sections are determined primarily by the identification of areas in which there is either a predominant tree species, or an identifiable group of tree species (commonly referred to as a "species association"). For example, the Missinaibi-Cabonga section is characterized by a forest which is mixed in character, consisting of an association of balsam fir, black spruce and white birch; and in the Central Plateau section, jack pine is the predominant species. The variation in tree species from one section to another is attributable to variations in factors such as surficial geology, soil type, climatic conditions, and drainage patterns. Within a section itself, tree composition can vary due to local drainage patterns and topographic features.

In the Great Lakes - St. Lawrence Forest Region, forest stands of a very mixed nature are characteristic. Conifers such as white and red pine, and hemlock, join hardwoods such as yellow birch, sugar maple, red maple, red oak, basswood and white elm as the principal species of the region. Other less common but wide-ranging species include white cedar, largetooth aspen, beech, white oak, butternut and white ash. Boreal species such as white and black spruce, balsam fir, jack pine, trembling aspen, balsam poplar and white birch also are intermixed throughout the region. This region is also subdivided into a number of sections, based on a consideration of factors similar to those considered for the Boreal Forest Region.

In addition to affecting that part of the physical environment comprised of the trees themselves, timber management affects other aspects of the terrestrial environment, such as soils, other vegetation and wildlife, as well as the aquatic environment. Because of the ubiquitous nature of timber management, the undertaking also has a substantial impact on the social, economic and cultural environment. It is difficult to force a description of these components of the environment from a discussion of the effects of the timber management

activities on the environment. As a result, these components of the environment are addressed in the discussion of the environmental effects of the undertaking which is presented in PART ONE, Chapter 11.

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11. POTENTIAL ENVIRONMENTAL EFFECTS OF THE UNDERTAKING

11.1 General

It is recognized that timber management operations may cause a variety of environmental effects. These effects may be positive or negative, short-term or long-term, direct or indirect, temporary or permanent, reversible or irreversible, or cumulative.

This chapter provides a description of the types and variety of potential environmental effects which may result from timber management operations across the range of forest and site conditions encountered on Crown lands in Ontario. The potential occurrence of any of the effects, their magnitude, and perhaps most importantly, the significance of the predicted effects, will vary between and within individual management units. This chapter will serve as the basic reference source for information on the potential environmental effects of alternative timber management operations when decisions among alternatives must be made during the preparation of Timber Management Plans for each management unit.

The timber management activities of constructing access roads and harvesting timber have the greatest potential to cause detrimental environmental effects. To a lesser extent, renewal and maintenance activities can also cause detrimental environmental effects. Renewal activities are, however, generally regarded as having considerable positive effects because they are undertaken to ensure re-establishment of the forest.

Most negative environmental effects can be prevented or minimized through proper planning and implementation of timber management operations, or mitigated through application of effective remedial measures. Some residual negative effects will have to be accepted as the inevitable consequences of the timber management undertaking. As described in PART THREE, Chapter 1 there are a variety of manuals which direct the implementation of timber management operations. These manuals describe actions which can be taken in varying situations to prevent, minimize or mitigate the effects of certain timber management activities on the environment.

The following sections describe the potential environmental effects of each of the alternative methods for the provision of access, harvest, renewal and maintenance. These effects are addressed under the headings of aquatic effects, terrestrial effects and social, economic and cultural effects. For harvest, renewal and maintenance operations, differences in the potential environmental effects for the clear cut, shelterwood and selection silvicultural systems are highlighted.

11.2 Provision of Access

11.2.1 General

As described in PART ONE, Section 9.2, most access is provided on land, primarily by road. Occasionally, rail or water access is also used, but solely for the purpose of transport of raw wood from management units to wood-processing facilities. Therefore, wherever rail or water access are used, it is in conjunction with a road access system. Air access is not used on an operational basis in Ontario, except for the specific activity of aerial application of pesticides for tending and protection purposes.

The construction of a road access system has the potential to result in the most significant permanent alteration to the environment in a management unit. The effects of roads on the aquatic and terrestrial components of the environment and on other users of Crown land forests are frequently the major concerns with timber management operations. Where rail or water access are used as part of the access system, there are fewer concerns, primarily related to the effects on the aquatic environment and other users of those travelways.

11.2.2 Roads

Aquatic Effects

The entire soil surface in the undisturbed forest is covered with a litter layer which protects the soil. Road construction disturbs this protective layer through such activities as clearing, grubbing and excavation. These activities expose mineral soil to the erosive forces of wind and water. In addition, road surfaces are highly compacted thus decreasing infiltration rates and increasing surface runoff. Runoff is concentrated in roadside ditches, further increasing the potential for erosion. For these reasons, roads can be a significant cause of accelerated erosion and subsequent sedimentation of contiguous lakes and streams.

Vegetative cover is a major factor influencing soil erosion. Vegetation both disperses and absorbs rainfall impact and stabilizes the soil with its roots. The extent of cutting and filling on slopes significantly affects the amount of vegetation and soil that is disturbed. Generally, the degree of soil disturbance is highest for primary roads and least for tertiary roads.

The occurrence of erosion from forest access roads is usually localized, being influenced by local topography and soil erodibility. Long, steep slopes are especially susceptible to erosion. The most erodible soils are those which are poorly drained and those with a high content of silt or fine sand.

The occurrence of erosion is also influenced by the frequency, intensity and duration of precipitation. The risk of erosion is generally greatest during spring melt and during rainfall.

The extent to which sediment generated from roads reaches a watercourse depends on several factors, including proximity of the road to the watercourse, slope and vegetative cover. Slope has a major influence on the distance sediment travels from a road as does the occurrence of obstructions such as standing trees or shrubs.

Stream crossings generally pose the highest risk for sedimentation, both from disturbance of the streambanks and the stream channel during construction, and from subsequent erosion related to improper installation or maintenance of crossings. Alteration of the natural stream channel to facilitate crossing can result in erosion from bank cutting.

Culverts and bridges can result in sedimentation if improperly designed, installed or maintained. Culverts which are too short can lead to loss of fill material to the stream; those which are undersized or which become blocked by debris can result in washout. Bridges constructed by placing fill over logs or poles are also prone to loss of fill. Improper installation of culverts and bridges can modify flows so as to cause impoundment or scouring. Impoundment is an even greater concern in situations where culverts and bridges have not been installed, although they are required.

Erosion on disturbed soils, such as road cuts and fills, is greatest during the first year after construction. As revegetation and stabilization occur, erosion is reduced. However, continued loss of sediment can occur where soils remain unstable.

Since frozen soils are resistant to erosion, winter road use generally poses less risk of sedimentation. Sanding of road grades to improve traction provides a source of sediment to watercourses during spring melt. However, the use of this practice on forest access roads in Ontario is very limited.

Abandoned roads can be continuing sources of sediment unless preventive measures are taken. Blockage of culverts or ditches by debris and sediment can lead to washouts and sedimentation. Ditches and unstable slopes can be subject to erosion which may continue for several years if bare soil is not adequately treated.

The deposition of sediment in watercourses can adversely affect water quality in several ways. Sediments suspended in the water column increase turbidity, the duration of which depends largely on sediment particle size and local currents. The loss of water clarity and associated colour changes can reduce aesthetic

values of a watercourse and limit recreational uses such as bathing, water skiing and fishing.

Increased sediment loads can also adversely affect domestic, industrial and agricultural uses of water. Costs of water treatment can be increased and reservoir storage capacity is reduced. Sediment can also damage mechanical equipment such as turbine blades and pump impellers. However, the risk of such effects occurring as a result of timber management operations on Crown land is low since these operations are generally conducted at locations remote from urban and agricultural areas.

Sedimentation alters aquatic ecosystems to a degree dependent on the nature, quantity and duration of sediment inputs and the sensitivity of local aquatic communities and their habitats. One of its effects, increased turbidity, reduces light penetration thereby reducing photosynthesis by algae and aquatic plants. Primary production is therefore reduced, and less energy is available to higher life forms in the food chain. Unless high turbidity levels persist, however, this reduction is generally temporary and production returns to normal.

High levels of suspended sediments can cause physical damage to gill membranes of fish and to other organisms such as zooplankton. The impact of such effects depends on the nature and levels of the sediments as well as the duration of elevated levels. For example, mortality of adult fish as a result of gill damage generally occurs only after exposure of many days to levels of 200 to 300 mg/l of suspended sediment.

Many fish species depend upon vision for feeding; hence, their feeding range can be reduced in turbid water. Likewise, angler success is reduced when turbidity is high. The deposition of sediment on a stream or lake bed can significantly alter the composition of the benthic community. Accumulation of fine sediments in gravel areas can reduce the abundance of some species of aquatic insects, including species which provide food for fish.

Sedimentation can adversely affect fish reproduction. Many fish species require a clean substrate to spawn successfully. Even if spawning has been successful, later

sedimentation may reduce survival of embryos by reducing levels of dissolved oxygen within the substrate, and may block the escape of emerging fry.

Failure to install bridges or culverts can block the movement of aquatic organisms, including fish. The blockage of culverts by sediment or debris can also prevent fish migration. Undersized culverts can obstruct fish passage by increasing water velocity. Improper installation of culverts can also prevent upstream fish migration by creating too large a drop at the downstream end.

Wetlands are generally very sensitive to road construction. Road fills can act as barriers to the normal flow of water through wetland areas, resulting in impoundment of water on the upstream side of the road and lowering water levels downstream. Biological communities can be altered on both sides. Also, sediment can fill in wetland areas, destroying the habitats of plant and animal species. Recovery from such conditions is hindered by the lack of flushing action typical of such areas.

Waste materials generated by construction of forest access roads can both degrade water quality and affect aquatic life. Wastes such as slash and other organic material decompose slowly in water, resulting in biochemical oxygen demand and a possible lowering of dissolved oxygen levels. The latter can be reduced below levels necessary to maintain existing aquatic communities. Because of the high oxygen requirements of developing fish embryos, spawning areas are particularly sensitive to deposits of slash.

Oil, gasoline and pesticides lower water quality and are generally toxic to aquatic life. These materials, or their degradation products, can also accumulate in the biota and some can cause tainting of edible species. However, if care is taken in disposing of such materials, the risk of serious contamination is low.

A number of chemicals are used for the maintenance of forest access roads. Materials used for controlling dust include waste oils and calcium chloride. Dust control is normally employed only around timber camps.

The use of waste oils on forest access roads is very limited. Potential effects include contamination of watercourses, affecting taste, odour and appearance

of receiving waters. Oil can also cause tainting of edible aquatic life. In addition, some waste oils may contain polychlorinated biphenyls (PCBs) which can accumulate in fish as a result of runoff from roads. Consumption of fish containing PCBs may pose a risk to human health. However, the PCB content of oils used for dust suppression is restricted by federal regulations designed to avoid significant contamination of watercourses.

Herbicides are occasionally used to control growth of unwanted vegetation along forest access roads. Herbicides can enter watercourses as a result of spills, direct application to watercourses, spray drift, surface runoff and leaching.

Herbicides are directly toxic to aquatic organisms, the degree of toxicity varying with the herbicide and its formulation, the species affected, water chemistry, turbidity and other factors.

Herbicides may also affect aquatic life indirectly. Indirect effects relate primarily to possible effects on aquatic plants. A loss of plants reduces the supply of oxygen to the watercourse. The removal of plants also reduces the availability of food for invertebrates, fish, and mammals such as moose and muskrats.

Use of herbicides may cause contamination of surface or ground water used for domestic purposes or for watering livestock. However, the risk of such effects is low since most forest access roads are located in lightly populated, non-agricultural areas.

Construction of forest access roads can provide public access to lakes and streams which were previously inaccessible by land. This often results in additional fishing pressure on these waters. The impact of increased fishing depends on the extent to which fishing pressure increases, the duration of the increase, and the capability of local fish populations to withstand exploitation. If fishing pressure is high and lake productivity low, fish populations may decline.

Terrestrial Effects

Road access systems may have an impact upon both game and non-game animal species. Effects may be direct or indirect.

The most significant direct effect of road construction on wildlife involves destruction of specific wildlife habitat features. Nesting sites, breeding areas, special feeding locations and winter shelter stands are examples of specific wildlife habitat features which may be adversely affected by road access systems.

Non-game animals which have specific habitat requirements that may be destroyed by road access systems include caribou, sandhill cranes, and osprey. Areas of endangered species habitat and areas of particular value to wildlife may also be adversely affected.

The disturbance created by the construction or use of access roads can significantly disturb some nearby wildlife. Bald eagle nesting trees, for example, can be rendered unusable if forest harvest activities or road traffic are closer than approximately 800 metres during the breeding season.

Herbicides that are used to control unwanted vegetation along forest access roads have potential detrimental effect on wildlife associated with wetlands or watercourses. Spills, direct application to watercourses, spray drift, surface runoff and leaching can potentially concentrate herbicides in receiving waters, resulting in a loss of aquatic vegetation or aquatic organisms. Wildlife such as moose and furbearers are at least partially dependent upon such habitat features.

Erosion at road cuts or in ditches may occur with some loss of roadside vegetation. Most importantly, sediment inputs to watercourses and wetlands may be accelerated by road construction activities with subsequent localized impacts on aquatic vegetation or organisms.

If roads are constructed across wetlands and insufficient allowance is made for the movement of surface and subsurface water, water levels may increase upstream of the barrier and may decrease downstream of the barrier. Biological communities, particularly flora, can be altered on both sides of the road.

Beaver frequently build dams at culvert entrances, resulting in flooding of wetlands, stream valleys or forests.

Road rights-of-way through heavily forested lands can benefit many forms of wildlife in that a more diverse pattern of vegetation can result. The opening in the forest canopy allows the development of herbaceous plants and shrubs, thus providing protective cover and feed for a variety of birds and mammals. However, the presence of a road and traffic where none existed before will create a risk of animals being killed by vehicles. This risk varies with the population of animals, their movement patterns and the volume of traffic. This risk to animals is slight for most lightly travelled forest access roads.

A significant indirect effect involves opening previously inaccessible areas to hunting and viewing of wildlife. In some cases this increase in recreational opportunities will be considered beneficial. In other situations, over-exploitation of big game animals may occur. This increased exploitation is a function of both improved human access and the concentration of animals in the limited cover remaining after forest harvest. For example, if local populations of moose and deer are "suddenly" made accessible to hunters by a road system, they may be overhunted in the area made accessible.

Hunting is controlled by changing the hunting season length and timing, by limiting hunter numbers in wildlife management units, and by restricting the number and species of animals which can be killed. None of these control programs are currently specific to precise local areas, and therefore, the potential of excessive kill following the introduction of new road access systems will be present. Roads can also provide access to boat launching sites, thereby enabling hunters to go to areas they would not otherwise be able to reach, except by float plane. In some circumstances, improved access may be considered beneficial if a better distribution of hunting pressure occurs.

Other game species (e.g. grouse, snowshoe hare, woodcock and rabbit) are sufficiently prolific and widely dispersed that road access systems alone will not affect their population levels seriously.

Social, Economic and Cultural Effects

The social, economic and cultural effects of access roads extend beyond the transportation of personnel, equipment and roundwood, and include tourism, recreational and other industrial uses.

One of the most significant values enunciated by the tourist industry, particularly in northern Ontario, is remoteness. While quality accommodation, fishing and hunting are extremely important, so too is the sense of isolation in an undisturbed forest area. The construction of access roads to lakes occupied by tourist operations is the single most important factor reducing remoteness.

Access roads for timber management purposes eliminate the rationale for, and the viability of, fly-in tourist operations, by providing an alternative form of access, which competes with that provided by the tourist operator.

Remote tourist establishments, particularly fly-in main base lodges, represent the investment of sizable amounts of private capital. Access roads for timber management purposes can result in significant devaluation of the market value of these operations.

In addition, the impact of access roads on the tourist industry can result in reduced operating revenues, reduced marketability, increased fishing and hunting pressures, degraded fish and wildlife populations, declines in angler and hunter success rates and increased conflict with other user groups.

While access roads can provide increased tourism benefits for that sector of the industry which relies on readily accessible Crown lands and waters, the net effect of access roads on the tourist industry can be reduced social and economic benefits.

Access roads can also create additional sport fishing and sport hunting opportunities, especially for local residents, and particularly where there is insufficient supply to meet current demand.

The amount of additional sport fishing and sport hunting provided depends on such factors as area of land, number of lakes and productivity of waters accessed, type of fish and wildlife communities and level of harvest. Heavy pressure may require intensive management if benefits are to be sustained.

Access roads can also affect other established land uses such as existing and candidate provincial parks. The use, function and theme of those parks may be affected by providing access to areas in close proximity. For example, new road access to areas close to a wilderness park may provide a means to gain access to previously-remote waterways, potentially affecting the wilderness quality of the park.

On the other hand, a road access system can establish the basis for future recreational development by providing access to areas for camping, cottaging and other outdoor recreational pursuits.

Access roads may also provide access to heritage resources which range from Indian rock paintings and sub-surface remains of prehistoric camps and villages to more recent historic structures such as mine buildings and marine railways. Such access may result in the disturbance or destruction of those resources, while on the other hand providing opportunities for research and interpretation.

Access roads can occasionally present opportunities for development which might not otherwise take place. Roads may be developed which provide better access to remote communities and native settlements, or which provide alternative access for land-locked communities.

Management of various provincial programs such as fire and pest control may also be enhanced, and opportunities for mineral exploration may be expanded as access to remote areas increases.

Similarly, new opportunities for commercial fishing, including the harvest of bait fish, may be created and the efficiency of trapping operations may be improved as new access road systems reduce costs.

Access roads and associated gravel pits will also result in the loss of productive forest land with the result that less land area will be available to meet future needs.

Impacts of new access roads vary in duration according to the type of road involved. Primary roads provide long-term access to an area, in excess of 10 years. Conversely, tertiary roads provide temporary access, and are not maintained beyond the period of their use (i.e. one month to five years). However, access by tertiary roads may extend beyond the maintenance period, particularly in winter. The specific social and economic impacts of any particular road will be dependent on the location of the road relative to the range of resource values in the area, its duration, and any use management controls which may be applied.

11.2.3 Rail

Aquatic Effects

Rail access systems are now uncommon in Ontario and new railway lines are unlikely to be built for timber management purposes. The impacts of existing railways on the aquatic environment are generally low.

At stream crossings, culverts which are improperly installed or maintained can prevent fish passage. Bark and other debris can be deposited at the railhead during the transfer of wood. Such debris could gain access to nearby watercourses. In slow-moving waters, decaying woody material can reduce dissolved oxygen levels and, under anaerobic conditions, can produce hydrogen sulphide. The latter can adversely affect municipal and recreational water use, and is toxic to fish. However, railheads are usually located well away from water to provide space for yarding of wood and for storage. Therefore, it is unlikely that significant amounts of debris would enter a watercourse.

Terrestrial Effects

Rail access systems may act as physical barriers to wildlife, inhibiting their movements or occasionally causing the death of animals. Ungulates sometimes use rail rights-of-way as winter travel corridors and spring/summer open space,

thereby resulting in collisions with trains. Effects could be significant in a localized area. As well, noise disturbance of wildlife may be a concern.

Social, Economic and Cultural Effects

The function and use of railways is similar to that of roads in terms of transportation of wood, but due to their high cost of construction and maintenance, they are rarely considered as a primary means of access for timber management purposes.

Tourist operators dependent on values strongly associated with remoteness and wilderness generally view rail systems as being more desirable and less impacting than other possible alternatives, particularly permanent road systems.

The use of railways for recreational, tourism and community access purposes, however, is very limited and the effects of railways on these activities are generally not significant.

11.2.4 Water

Aquatic Effects

Use of water access is now very limited in Ontario. However, where it is used, this method of access can have significant effects on the aquatic environment.

The construction of landings near the water's edge to facilitate log handling results in removal of vegetation and soil compaction. This may be accompanied by increased shoreline erosion and sedimentation.

Bark and other woody debris can be lost to the watercourse during the various phases of the transport operations. These include unloading of logs at the shore, storage, water transport, and, finally, removal of logs from the water. Such debris can degrade water quality by increasing turbidity and suspended solids. Levels of dissolved oxygen may also be reduced.

Bark and related debris can smother aquatic plants and benthic invertebrates. Since bark decays slowly, such effects tend to persist. Woody debris can also prevent adequate provision of water and oxygen to fish eggs deposited in bottom sediments, thereby increasing egg mortality.

During storage or transport of wood, logs can become waterlogged and sink to the bottom. Such logs can destroy benthic organisms and cause compaction of bottom sediments.

Log driving can result in gouging of streambanks and stream bottoms causing erosion, sedimentation, and the loss of fish habitat. Dams are occasionally used to release water periodically to facilitate log driving. This produces surges of water and logs, which increase the potential for bottom and bank erosion. Such dams form an obstruction to fish migration and their use can prevent fish from spawning. Fish eggs and benthic organisms can be destroyed by scouring and sedimentation.

Terrestrial Effects

Clearings created at the shore as log dumps can result in erosion with subsequent sediment deposition in the adjacent waterbody. Siltation in the littoral zone can destroy or reduce both aquatic vegetation and organisms, thus adversely affecting wildlife dependent upon them (e.g. mink, muskrat).

Social Economic and Cultural Effects

Wood is rarely transported by water in Ontario. However, where this method is practised, water-oriented outdoor recreation and tourist activities can be adversely affected.

Floating and submerged logs, for example, represent a serious potential hazard for pilots attempting to land pontoon-equipped aircraft and passengers at main base lodges, outpost camps and Crown land sites. Similarly, floating and submerged logs can represent serious potential hazards for boaters and swimmers.

Sport and commercial fishing quality also can be impaired as fish populations are reduced as a result of degraded water quality, sedimentation and the loss of habitat.

Conversely, river drives and log booms represent historic activities which can result in some tourism benefits (i.e. sightseeing, photography, etc.).

11.2.5 Air

Few significant effects are known, although some disturbance of wildlife could occur if prolonged noise from aircraft should occur. In order to accommodate takeoff and landing, portions of access roads may be widened, thereby increasing some of the effects described in PART ONE, Section 11.2.2.

11.3 Harvest

Harvest operations have the greatest potential of all of the activities of timber management for incurring significant detrimental environmental effects.

The extent and magnitude of the potential environmental effects of the variety of alternative methods of implementing timber management will vary among the three silvicultural systems used in Ontario. The differences in the potential environmental effects for the three silvicultural systems are highlighted in the applicable sections.

Aquatic Effects

The removal of forest cover results in increased total water yield of the formerly forested area, and in certain instances, increased surface runoff, because of the loss of interception and evapotranspiration by the forest. The size of the increase in water yield is variable. In a study of harvesting effects in northwestern Ontario, water yields increased from 44 to over 300 per cent on a monthly basis in the first year after clear cutting. Increases in yield are positively related to the amount of reduction in forest cover. Hence for a given area, large

clear cuts will generally increase streamflow to a greater extent than smaller ones. The increase in water yield diminishes rapidly as revegetation takes place.

The loss of transpiration generally results in an elevation of the water table where it occurs in the harvested area. This may increase groundwater supplies for domestic or other purposes. As the area becomes revegetated, the effect is reduced.

The seasonal distribution of streamflows may also be affected by cutting. In general, cutting results in higher peak flows. Increased peak flows can cause scouring of bottom sediments and streambanks, resulting in increased turbidity. Extreme peak flows can result in flooding of downstream areas, posing a risk of additional erosion and structural damage. However, it is doubtful that normal clear cutting practices increase peak flows sufficiently to pose a significant risk of flooding downstream.

Scouring of bottom sediments results in dislodgement of benthic invertebrates and fish eggs. High flows can accelerate bank cutting and stream widening with resultant loss of fish habitat.

The effect of forest removal on low flows is variable. Both increases and decreases in low flows after harvesting have been reported. Decreases in low flows may be of concern in small streams where living space for fish may already be scarce during the low flow seasons of late summer and mid-winter.

In general, the effects of harvesting on water yield are greatest in the first year. As revegetation occurs, water yields return to normal although the process may take some time.

In areas removed from watercourses, the felling of timber has little direct effect on the aquatic environment. However, felling of trees into or near watercourses can damage streambanks and lead to erosion and sedimentation. Unless removed, trees felled into a watercourse can also have a damming effect, resulting in bank cutting and erosion. Fallen trees and debris can also form obstructions to fish passage; conversely, for some species of fish, fallen trees and debris provide shelter. Under the selection silvicultural system, the use of smaller

harvesting machines may result in less soil disturbance and vegetation damage near watercourses than under the clear cut silvicultural system.

Removal of timber near watercourses can affect the productivity of aquatic systems. Much of the energy available to stream ecosystems in forested areas is derived from leaves and other detritus provided by nearby trees.

The detritus supplies food for invertebrates which in turn provide food for fish. Fish also consume terrestrial insects which fall into the stream from nearby vegetation. Removal of streamside vegetation during timber harvest thus removes a major source of food for some species of fish. As revegetation occurs, the food supply is replaced.

Trees and other vegetation near streams also lower water temperatures by shading. Removal of timber can result in higher summer temperatures and light levels, thus increasing stream productivity. These changes may enhance fish production and benefit recreational uses such as swimming. However, they can be detrimental to coldwater fish populations, particularly in streams where summer temperatures are already borderline. Removal of vegetation may also bring about a reduction in dissolved oxygen levels, since the solubility of oxygen decreases with increasing temperature.

Harvest operations can alter the nutrient balance of a watershed. Increased inputs of major ions such as calcium, magnesium, and potassium, as well as carbon, nitrates and phosphorus to streams can occur following deforestation. Such an effect can enhance the biological productivity of watercourses. This may be beneficial in some cases. In other cases, it can lead to eutrophication and the production of undesirable algae. Fish species, such as lake trout, which require oligotrophic conditions, can also be affected adversely. In addition, high nitrate levels may pose a health risk to humans consuming the water.

The extent and significance of nutrient inputs from clear cutting are difficult to assess. Study results vary widely because of variation among study areas and experimental treatments. Generally, nutrient input has been reported to be low. Revegetation reduces both the magnitude and duration of nutrient losses. In a

northwestern Ontario study, stream concentrations of most elements returned to near normal within two years following clear cutting.

Water yield and nutrient loss are affected minimally by selection cutting since the remaining trees and vegetation quickly take up surplus water and nutrients. Selection cutting has a smaller effect on water yield than does block clear cutting, even with the removal of the same number of trees. The effects of shelterwood cutting on water yield and nutrient loss are probably intermediate between the other two silvicultural systems.

Extraction of timber from harvest site to landing can contribute to accelerated erosion by destroying vegetative cover, compacting soil and forming runoff channels. With the use of conventional skidders, the same skid trail may be used repeatedly which tends to expose and compact the mineral soil, reducing infiltration rates and increasing the potential for erosion. Forwarders rarely use the same path more than once. Wetland areas are particularly susceptible to the formation of runoff channels. New skidder technology, including the use of wide tires, does reduce soil damage.

Revegetation of abandoned skid trails restores the litter cover and reduces the risk of erosion. Alternate freezing and thawing during winter and spring also loosens compacted soils.

The potential impact of timber extraction on the aquatic environment is largely determined by the proximity of watercourses. Skidding in or near watercourses greatly increases the risk of sedimentation from surface and bank erosion. It also increases the potential for deposition of logging debris in the watercourse and can destroy streamside vegetation.

Log landings are potential sources of sediment to nearby watercourses, since the original ground vegetation is largely destroyed and soils may be highly compacted. The degree of soil disturbance is dependent on the number and size of landings used in a specific harvest operation. Landings are also potential sources of bark and other debris. Landings are often adjacent to forest access roads as simple widenings of the road. Provided they are not located adjacent to watercourses, the potential for aquatic impacts is low.

Terrestrial Effects

The forests of the Boreal Forest Region have evolved through time with various disturbances, primarily fire, insect defoliation and wind storms. Wildlife species which exist in the boreal forest are adapted to such periodic disturbances.

Timber management operations represent another form of disturbance which wildlife species are well-equipped to survive, provided that those operations mimic natural events as much as possible. Natural disturbances frequently leave unaltered or marginally affected patches of vegetation for wildlife food and shelter. As well, damaged organic material remains on site to decompose and replenish the soils. When timber management operations, including harvest operations, do not mimic natural disturbance patterns, problems for wildlife can occur.

The forests of the Great Lakes-St. Lawrence Forest Region have also had periodic disturbances imposed upon them for thousands of years. Although not as extensive or pervasive, the disturbance factors are similar to those of the more northern boreal forest (i.e. fire, wind and insects). Wildlife in these forests have been able to cope with these changes.

The conditions created by recurrent natural disturbances can create good habitat for wildlife. Some animals react to the very specific conditions created by fire, while others exploit the general pattern or mosaic of vegetation. For example, sharp-tailed grouse of northern Ontario are particularly drawn to open and semi-open areas, such as those that have been recently burned over. Some birds (e.g. woodpeckers) take advantage of the snags often produced by fire. At the other end of the spectrum are generalists, such as white-tailed deer and moose, which use a variety of successional stages and use several different vegetation types.

Harvest operations may have significant impacts on local wildlife populations present at the time of cutting. Wildlife numbers in the vicinity of the harvested area will be reduced immediately following harvest operations. Because they have evolved in the presence of disturbance, however, most wildlife populations can cope with the disturbance imposed by timber harvest, if the harvest operation maintains habitat diversity over a large area. In the short term, area sensitive species that favour a large expanse of undisturbed forest and those

making use of old growth forest components (e.g. cavity nesting birds), will be most affected by harvest operations. This impact can be lessened if these habitat components are maintained in proximity to the cut area. As the regenerated forest ages and old growth features (e.g. snags) re-appear, wildlife utilizing such features will establish themselves.

Some wildlife species colonize and exploit the newly-cut areas, while others colonize the successional stages between cutting and maturity.

To the extent that removal of timber alters streamflow or productivity, some forms of wildlife can be affected. For example, wildlife who eat fish (e.g. mink, herons, etc.) can be adversely affected by the reduced fish populations stemming from the loss of bottom dwelling aquatic insects, or holding cover (pools, riffles, overhanging banks). Overly-enriched streams, silt-laden water, and the erosive powers of increased streamflow, can contribute to a lower quality of furbearer habitat. Conversely, should the slight warming or enriching of a stream lead to increased fish production, fish-eating wildlife could benefit, providing their other habitat components (i.e. denning areas, nesting sites, escape cover, etc.) are adequate. In a similar way, but to a lesser extent, wetland wildlife can be potentially impacted by nearby harvest operations that result in accelerated erosion and deposition of silt in low areas. The physical filtering effect and nutrient uptake of wetland vegetation will in many cases limit the primary effects to the periphery of the wetland.

The kind and degree of forest disturbance as well as the proximity of the disturbance to the watercourse or wetland will determine its impact on water-dependent wildlife. Large clear cuts will generally have a greater impact on water yields, nutrient inputs and stream temperatures than smaller clear cuts. The shelterwood silvicultural system can be expected to have somewhat less impact on such factors, and the selection silvicultural system will have the least effect.

The forwarding system used (e.g. conventional skidders, forwarders, horses) can have variable effects on erosion by destroying vegetative cover, compacting soil and forming runoff channels. Similarly, the erosion from log landings can result in sediment deposits in nearby streams or wetlands.

On upland sites, no matter which silvicultural system is used, if a mosaic of vegetation is produced, with a variety of species and age classes, wildlife populations in the long term and over a large area will not be seriously reduced, and may increase. Any silvicultural system which changes the forest pattern from a diverse plant community to monotypic stands containing primarily one species or age class will usually cause wildlife populations in the immediate area to decrease.

This decrease will vary with the wildlife species, and will be in proportion to the magnitude of change from diverse pattern to monotypic growth. An extensive mature jack pine stand, for example, may not be good moose habitat prior to cutting. Clear cutting that stand would not significantly reduce the quality of that habitat for moose, although it may seriously impact local woodland caribou and spruce grouse populations.

The impact of clear cut harvest operations on wildlife populations depends on the kind of plant community present before harvest, and the size and shape of the clear cut. Boreal mixed-wood forests, for example, have at least 150 different species of breeding birds, making them one of the richest breeding habitats on the North American continent. They are also highly preferred habitat for moose and other northern wildlife. Extensive jack pine and black spruce stands, however, support relatively few, specialized wildlife species, such as spruce grouse and woodland caribou.

Large clear cuts (i.e. greater than 130 hectares) which remove all standing timber from monotypic stands of jack pine or black spruce may not in the long term seriously affect the wildlife species which inhabit them. Large scale disturbance in such forest types are relatively common and the wildlife species have evolved to cope with them. If other mature stands are present within travelling distance of these stands, the animals will usually move to them.

Similar large clear cuts in mixed-wood forests, however, can be very detrimental to wildlife. Many wildlife species are adapted to diverse plant communities with good interspersed food and cover. Large clear cuts, and the associated forest management operations which follow, may produce conifer regeneration at a commercially acceptable level; but the original forest is altered from a diverse

community of plants to a relatively monotypic stand of timber. When this change is produced, the value of the forest as wildlife habitat is seriously reduced. Wildlife populations are reduced in proportion to the magnitude of change in the forest type.

An indirect effect of large clear cuts on moose is their increased vulnerability to hunting. Although an improved food source for moose may regenerate in a few years after harvest of the forest, the lack of protective screening cover makes moose susceptible to hunting.

Smaller clear cuts with irregular edges, and which are not converted to pure conifer regeneration, are not seriously detrimental to most wildlife species.

The clear cut silvicultural system is not commonly used in the Great Lakes-St. Lawrence Forest Region. If it should occur with cuts exceeding 130 hectares, it would have a similar detrimental impact on wildlife species as it does in boreal mixed-wood forests. Smaller cuts (i.e. less than 50 hectares) often improve wildlife habitat in this forest type because they result in a greater diversity of plant communities.

The selection silvicultural system tends to favour maintenance of a closed canopy forest with primarily shade-tolerant tree species. It also favours animals adapted to mature forest types, since very little cutting occurs which allows establishment of early successional forest types.

White-tailed deer do not favour this habitat type, although some species of birds and smaller mammals find their food and shelter requirements here. Eventually, this system will result in a mature forest with animals adapted to that forest (e.g. wood warblers, flying squirrels, red-shouldered hawks, deer mice). Harvest operations have an impact only upon the specific animals associated with certain trees or other habitat features. Impacts on wildlife populations are usually very minimal.

The shelterwood silvicultural system results in even-aged stands, as does clear cutting, but the process of harvesting is protracted so that a forest canopy of

some form always exists in the area. Generally, it tends to be good for wildlife and leaves good habitat quality.

This type of harvest usually benefits wildlife, if the managed areas are not excessively large. For example, an area of 500 hectares, cut in strips in the first year, with "leave blocks" removed five years later, may be virtually the same as a large clear cut. However, if limits are put on how high the regeneration in the cut areas should be before the "leave block" is cut, the result of this type of harvest operation can be beneficial to wildlife.

The timing of harvest operations can be important to wildlife. For example, caribou migration may be inhibited or some birds may abandon their nests if disturbed by forest operations at certain times of the year. White-tailed deer can benefit from the browse supplied by winter cutting of hardwoods adjacent to yarding areas.

Social, Economic and Cultural Effects

The effects of harvest operations on tourism and outdoor recreation are primarily related to the loss of aesthetic appeal and site damage. In particular, in remote areas, tourist operations can be adversely affected when wilderness characteristics are destroyed and/or the tourist's desire for a sense of isolation in undisturbed forests is not satisfied.

Remoteness has a number of ingredients including such elements as visual quality, isolation from other forms of development, difficult access and an exclusive type of use for the guest who finally arrives at the tourist operation. Canoeists, hikers and other visitors to the area may also find the aesthetic value of the scenery altered to such an extent that they too no longer find the area attractive.

Where substantial private capital investments have been made, tourist operators require protection from both the devaluation of their assets and the reduction in operating revenue which can result from harvest operations.

Where operations coincide with fishing and hunting seasons, the harvest operations and associated noise disturbance can reduce the enjoyment derived from these forms of recreation. Wildlife populations can also be significantly displaced with possible serious implications for commercial tourist operators dependent on sport hunting.

The alteration of the age class structure of the forest may affect adjacent areas, potentially resulting in windthrow problems and blockage of recreational travel routes. Existing traplines may also be temporarily disrupted by harvest operations, especially through the loss of forest cover. Potential disturbance of unknown archaeological sites as a result of site damage may also occur.

Harvest operations may affect mineral exploration. Reference grids outlining the area of a claim are often marked by using standing trees, pickets or cut lines. These reference grids may not be known to timber operators and can be destroyed during harvest operations or rendered unrecognizable among the slash and debris left behind.

The direct economic benefits of harvest operations are the provision of wood for the market and the employment generated. Both of these have indirect and multiplier effects on the local, regional and provincial economy.

Per cubic metre of wood harvested, the clear cut silvicultural system is the most economical method of harvest operation, particularly in the Boreal Forest Region. The value of a cubic metre of pulpwood, the most common unit of measure in the Boreal Forest Region, is much less than that of a hardwood sawlog or a veneer log, more common products produced by the selection and shelterwood silvicultural systems in the Great Lakes-St Lawrence Forest Region. It is essential that the relatively low per cubic metre cost of harvesting pulpwood be maintained as this can account for 30 per cent or more of the cost of a tonne of pulp, the primary product.

11.4 Renewal

11.4.1 Site Preparation

Aquatic Effects

Mechanical site preparation disturbs the soil to facilitate regeneration. Therefore, it is a potential cause of erosion until such time as sufficient revegetation has occurred to stabilize the soil. The potential for erosion depends on the extent to which mineral soil is exposed and the nature of the soil, since coarser-textured soils are less subject to erosion. The type of equipment used may also be a determining factor. Unless the equipment is directed straight downslope adjacent to watercourses, sedimentation is low. Mechanical site preparation of previously-compacted areas such as landings and skid trails facilitates revegetation and may reduce erosion potential.

Potential effects of herbicides on the aquatic environment were described in PART ONE, Section 11.2.2. The effects of chemical site preparation using herbicides are similar in kind to those of road right-of-way maintenance.

However, the use of aerial spraying in site preparation increases the potential of herbicides entering watercourses through drift. Herbicides are normally used only in the clear cut silvicultural system.

Prescribed burning of vegetation and logging debris infrequently increases the risk of erosion because almost invariably some surface organic layers remain unburnt. Surface runoff may be increased on moderate and steep slopes, leading to potential stream channel scouring and sedimentation. The magnitude of such effects is variable but appears to be partly a function of the intensity of the fire. Very hot fires can result in greater exposure of mineral soil than more moderate fires. In general, the impact of such changes as a result of prescribed burning appears to be small.

Burning increases water yield and can result in washing of ash and nutrients into watercourses. A high intensity forest fire in northwestern Ontario resulted in loss of nitrogen, phosphorus and potassium, but not to an extent where receiving

waters were affected adversely. Loss of nutrients from prescribed burning of moderate intensity is probably smaller.

Burning destroys streamside vegetation, thereby removing shade and causing long-term increases in water temperature. Under some circumstances, temperatures can rise to levels lethal to coldwater fish species.

Effects of prescribed burning are reduced as re-vegetation of the area occurs. In northwestern Ontario, water yields returned to normal within three years of the occurrence of an intense wildfire.

At present, the effects of prescribed burning are minimal, since the practice is not used on a large scale in Ontario.

Terrestrial Effects

Site preparation can have a negative impact on wildlife habitat. The new forest crop in the clear cut silvicultural system usually comprises conifer trees suitable for commercial exploitation, and the competing vegetation is the deciduous trees and shrubs which are important components of wildlife habitat. When site preparation is successful in reducing the number and variety of deciduous trees in favour of conifers, habitat quality is reduced for many wildlife species.

Mechanical site preparation is not particularly detrimental or beneficial to wildlife habitat. However, problems occur when the tracked vehicles run over and destroy patches of vegetation left standing after harvest operations.

Impacts of chemical site preparation depend on the particular chemicals involved. Depending particularly upon the duration of their effectiveness, chemicals controlling herbaceous and secondary growth may adversely affect such herbivores as moose, deer, and rabbits. In general, however, if such chemicals are not toxic to wildlife, this technique is less damaging than mechanical site preparation.

Prescribed burning is the least harmful site preparation technique to wildlife habitat. Fires of moderate intensity are less likely to damage soil or create

nutrient losses than very hot fires. Potentially, the washing of ash and nutrients resulting from fire into watercourses or wetlands can have negative effects on water-associated wildlife. However, fire is a normal part of the ecology of Ontario forests and its use in site preparation does not appear generally to be detrimental.

Social, Economic and Cultural Effects

The effects of site preparation on tourism and outdoor recreational activities are primarily confined to the period of operation. Activities such as shoreline picnicking and hiking can be unappealing during site preparation. Adjacent areas used for tourism and outdoor recreational purposes may also be affected by smoke, noise and the sight of equipment during operations.

Chemical site preparation renders a cutover unsuitable for certain outdoor recreational activities, such as berry picking during the growing season of application, but enhances it in subsequent growing seasons by favouring non-woody vegetation.

Prescribed burning may reduce the aesthetic appeal of a cutover for tourism and recreational uses until such time as regeneration becomes established. Conversely, an area subject to prescribed burning may appear more natural and visually appealing than either an area freshly harvested or mechanically site prepared.

In northern Ontario, under the clear cut silvicultural system, mechanical site preparation costs are normally in the range of \$190 to \$280 per hectare, while (aerial) chemical site preparation costs range from \$50 to \$190 per hectare, and prescribed burning costs range from \$70 to \$180 per hectare. Site preparation costs in southern Ontario, where the shelterwood and selection silvicultural systems predominate, range from \$120 to \$340 per hectare for mechanical treatment to \$220 to \$400 per hectare for (ground) chemical site preparation.

11.4.2 Regeneration

Aquatic Effects

Regeneration has minimal adverse effects on the aquatic environment since neither seeding nor planting has any impact. However, artificial regeneration usually involves site preparation with its attendant effects.

Regeneration of harvested areas reduces many of the potential impacts of harvest operations relating to water yield, erosion, nutrient loss, and stream temperature. The rate at which such impacts are reduced depends on the speed with which re-vegetation occurs. Artificial regeneration may establish a vegetative cover more rapidly than natural regeneration.

Terrestrial Effects

The managed forest that is re-established will not duplicate in its entirety the forest that existed prior to harvest. As a result, wildlife species and numbers will vary from pre-harvest status. A continuum exists, and as vegetation changes, so will wildlife species and numbers.

Artificial regeneration efforts, depending on the nature of the pre-harvest forest, can produce dramatic changes in forest cover and thus induce changes in the wildlife community. For example, the conversion of an uneven-aged mixed-wood stand to an even-aged predominantly coniferous stand with less vegetative diversity may be reflected in less diverse, less productive wildlife populations, but the extent of the stand and its surrounding forest are determining factors.

The size and configuration of planted or seeded areas, the success of these regeneration efforts, and the proximity of other diverse habitat components (e.g. openings, streams, other ages and species of trees, etc.), will moderate the effects of forest regeneration on wildlife.

Natural regeneration normally provides a greater variety of vegetation and habitat conditions resulting in better wildlife habitat quality. Whatever the nature of the newly regenerated forest, its species composition and structure

will always change over time. This means that as a habitat its conditions will vary. Normally, greater species diversity occurs in the earlier years of stand development.

Social, Economic and Cultural Effects

Regeneration of cutover lands can restore the aesthetic appeal of an area for tourism and outdoor recreation. The extent to which this occurs, however, depends on the timing and success of regeneration, as well as on the type of forest which results.

Long delays before regeneration is initiated and successfully established can leave tourist operations vulnerable to, and unprotected from, undesired and unplanned access. Speedy and successful regeneration, on the other hand, can ensure that visual quality, as well as a sense of remoteness, are quickly re-established.

Many tourist operations are also dependent, either wholly or in part, on sport hunting for moose, deer and bear. These species often favour the early succession habitat provided by newly regenerated forest lands. Conversely, however, through regeneration efforts, poplar and birch forest stands, which are productive for wildlife and often ecologically diverse, may be converted into pine or spruce stands which generally have less diversity and lower wildlife productivity.

A direct economic impact of both natural and artificial regeneration is the provision of timber for future harvest. Employment opportunities in tree seed collection, nurseries (i.e. seedling production) and planting occur only with artificial regeneration.

The silvics of the tree species to be regenerated, and the harvest method used, are prime factors in determining which regeneration technique will be used. Natural regeneration techniques are the least costly. Aerial seeding is the most economical form of artificial regeneration, costing as little as \$8 to \$15 per hectare. Seeding during site preparation usually costs in the range of \$100 to \$165 per hectare. Seeding, however, is species and site specific, and can only be

utilized on a portion of the areas to be regenerated. In 1982, approximately 50 per cent of the Crown lands treated using artificial regeneration involved seeding.

Planting is the most expensive regeneration technique. In northern Ontario, the planting of container stock generally costs in the range of \$250 to \$310 per hectare, while the planting of bareroot stock may cost in the range of \$255 to \$640 per hectare.

These costs, with the exception of seeding during site preparation, do not include the costs associated with site preparation activities which are conducted prior to the regeneration activity. They also do not take into consideration the probabilities of success, which are generally lower for seeding than planting.

11.5 Maintenance

Aquatic Effects

Manual and mechanical cleaning methods have minimal impact on the aquatic environment. Any surplus water or nutrients resulting from removing vegetation are quickly used by remaining trees.

Cleaning with herbicides is the most common tending method in the Boreal Forest Region. The ways in which herbicides can enter surface water or groundwater, and the results that may occur, were previously described. Cleaning may be carried out by either ground or aerial application of herbicides. The potential for drift is greater with aerial spraying.

Chemical and biological agents are applied by aerial or ground application to reduce insect damage in commercial and high-value forests. The most important routes by which insecticidal materials enter surface water are direct application to watercourses and spray drift. The potential for direct application is greatest when an area containing numerous small streams is sprayed from the air. Under such conditions, it may be difficult for the applicator to see such streams or to avoid spraying them. In general, the potential for insecticides to reach

watercourses through drift is also greatest with aerial spraying, which is normally used only in the clear cut silvicultural system.

Chemical insecticides vary substantially in toxicity to aquatic life. Potential toxic effects include acute toxicity to zooplankton, fish and benthic invertebrates. Insecticides may also cause sublethal toxic effects. In Ontario, mature stands are sprayed for no more than three years before they are harvested. Spraying is done, at most, twice in any year.

Use of biological control agents such as bacteria and viruses in forest spraying is relatively recent. The environmental effects of such agents are not fully documented. However, available evidence suggests that the effects are minor. The biological activity of such agents is highly target-specific.

Residues of chemical insecticides can accumulate in aquatic biota. Bioaccumulation of organophosphate and carbamate materials, which are currently in use, generally occurs to a much lesser extent than chlorinated hydrocarbons, which were formerly used.

Use of insecticides may cause contamination of surface water or groundwater used for domestic or agricultural purposes. The significance of such contamination depends upon the degree and kind of exposure of humans or animals to the insecticide, its toxicity, formulation, persistence, water chemistry and other factors.

Terrestrial Effects

Cleaning operations can affect wildlife, particularly through the use of herbicides to suppress deciduous trees and shrubs. The herbicides presently used in timber management, when applied at approved rates, do not bioaccumulate to levels of acute or chronic toxicity in wildlife. The low persistence of herbicides, the high tolerance of animals to them, and their rapid rate of excretion, prevent such problems.

The major effect of herbicides is to alter wildlife habitat. The period of suppression of vegetation is variable with the site and the chemical treatment

being used. For example, regenerating (young) deciduous trees and shrubs are valuable browse species for moose and deer. The suppression of such vegetation over a broad area for an extended period would lessen the suitability of the area for ungulates.

Conversely, herbicides applied at certain rates can increase browse production. As well, herbicide use may assist in re-introducing a wildlife habitat component (e.g. conifer cover) that has been removed by timber harvesting. This will benefit wildlife dependent upon such areas (e.g. moose wintering areas), or upon mixed-wood forests (e.g. various warblers).

Chemical pest control can have an impact upon wildlife in an indirect way. All of the insecticides currently in use for aerial spraying in Ontario are either biological in nature, organophosphates or carbamates. These materials do not become stored in body fat and do not bioaccumulate. This is in marked contrast to the organochlorines such as DDT which do bioaccumulate. Mild exposure to organophosphates, carbamates and biologicals at infrequent intervals does not result in cumulative effects. If overexposure occurs, acute toxic reactions are observed. Once the individual has been removed from further exposure, recovery is usually rapid with no serious after-effects.

However, chemical insecticides vary in species specificity, and their use can result in a generally depressed insect abundance in the area sprayed. As the reproductive season for wildlife corresponds to peaks in some insect populations, the survival or growth of young birds and certain small mammals can be threatened by a temporary lack of food. This effect is mitigated somewhat by such factors as re-invasion by insects from surrounding unsprayed areas, movement of birds and mammals to unaffected areas, and the hatch of some insects after spraying.

Biological controls, being more species-specific, allow wildlife to divert their feeding activities toward unaffected insects.

Run-off from areas fertilized to increase forest growth could result in accelerated plant and algae growth on nearby watercourses, ponds, lakes, or wetlands.

Water-associated furbearers such as muskrat could benefit from increased ant

growth, as could mink or otter if fish production is increased. Conversely, if over-nutrification of a stream causes a decline in fish production, fish-eating furbearers could suffer.

Drainage of wetlands for timber management purposes has adverse effects on the wildlife and vegetation associated with the wetland. These characteristics will vary from wetland to wetland.

Stand improvement, which involves the removal of undesirable trees, has potential adverse effects on wildlife. Trees with poor form that may be dead or dying, and that contain numerous cavities, are often valuable as denning, nesting, feeding and perching sites for many forms of wildlife. However, this stage is not reached until the late stages of tree maturation, and the removal of small diameter trees to improve tree growth during a forest's regeneration phase should have little adverse impact on wildlife. It is more important to wildlife that some of these trees remain after harvest to provide an element of vegetative diversity.

Social, Economic and Cultural Effects

For specific maintenance operations, such as improvement operations involving selective tree removal or protection operations involving the application of fungicides to tree stumps, manual operations are often the only practical alternative, in spite of their high costs.

However, due to the large areas usually involved and the associated economics, tending and protection operations commonly involve the aerial application of pesticides. In northern Ontario, average costs are \$140 per hectare for manual tending, \$50 per hectare for aerial application of herbicides and \$140 per hectare for ground application of herbicides. In southern Ontario, where tending activities are somewhat different, average costs are \$80 per hectare for manual tending, \$150 per hectare for ground application of herbicides, \$70 per hectare for mechanical tending, \$130 per hectare for improvement operations (i.e. thinning), and \$80 per hectare for pruning.

In 1982, 80 per cent of the tending program was undertaken aerially with herbicides. This work was carried out on less than two per cent of the Crown land forests of Ontario.

Stand improvement work is a high-cost, manual tending treatment. It is used primarily in conjunction with the selection and shelterwood silvicultural systems, where high-value crop trees such as hardwood veneer and sawlogs are being produced. The high value of the raw product justifies the use of this expensive tending treatment.

In some instances, however, the same high value crop trees which are important to the forest industry may also provide important scenic benefits to the tourist industry. Similarly, the removal of undesirable species, such as aspen and birch, may reduce species diversification and affect the quality of the forest from a tourism or aesthetic point of view.

Fertilization, drainage and cultivation activities are relatively high-cost tending techniques which are not widely practised in Ontario. In 1982, less than one per cent of the tending program involved these techniques.

The use of herbicides and insecticides/fungicides for tending and protection purposes may create concern for possible health effects among local residents and recreationists. The degree of human exposure depends greatly on human use of the area, the scale and method of pesticide application, and the extent to which agricultural products and natural crops such as berries are exposed to the chemicals.

The use of pesticides can reduce the appeal of the treated lands for recreational use for the remainder of the growing season in which they are applied. The local tourist industry may be adversely affected for this period of time. Conversely, the use of pesticides may significantly preserve tourism and outdoor recreational values by maintaining forest cover and scenic qualities which might otherwise be damaged or destroyed by insect/disease pests.

The application of pesticides and the maintenance of healthy forest cover can also significantly lessen the hazard for forest fires and the potential destruction of tourist lodges, outpost camps and ancillary structures.

PART TWO

THE TIMBER MANAGEMENT

PLANNING PROCESS

PART TWO: THE TIMBER MANAGEMENT PLANNING PROCESS

1. INTRODUCTION

1.1 General

All of the activities which comprise the undertaking of timber management on Crown lands are addressed in Timber Management Plans. These plans are prepared for each management unit in the province. The Timber Management Plan is the controlling document for the implementation of the undertaking within each management unit. As discussed in PART ONE, Chapter 5, it is MNR's position that through the application of a common planning process which addresses environmental effects and the interests of other users of Crown land forests, the purpose of The Environmental Assessment Act will be attained. PART TWO, Chapter 2 provides a detailed explanation of the planning process which is applied in the preparation of a Timber Management Plan.

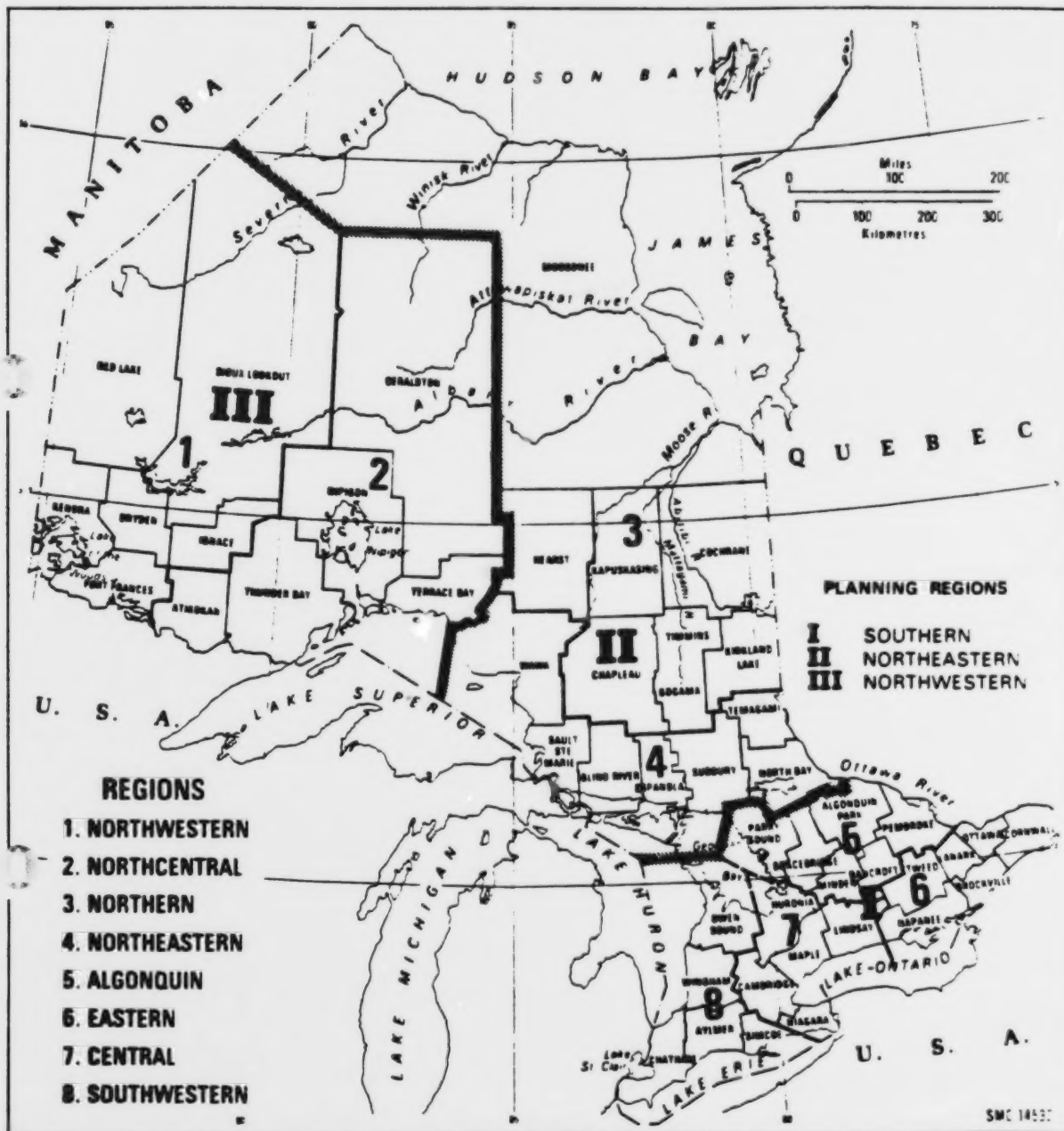
A Timber Management Plan provides specific direction for all timber management operations within a management unit, based primarily on specific information which pertains to the individual management unit. In the timber management planning process, however, direction is also provided from higher levels of government decision-making. In 1972, Cabinet approved a Forest Production Policy for Ontario which provides overall direction for MNR's Forest Resources Program. MNR also has policies which provide direction for timber management. As well, in 1983, MNR completed an extensive program of land use planning which provides further direction for the Forest Resources Program. The following discussion provides an explanation of the role of these other levels of decision-making in the timber management planning process.

1.2 Land Use Planning

All MNR Regions and Districts (Refer to FIGURE 1.2-1) have undergone land use planning, primarily to co-ordinate the requirements of various programs such as forestry, provincial parks and recreation, fisheries, wildlife tourism, minerals, and energy. A product of land use planning for each District was the

FIGURE 1.2-1

Ministry of Natural Resources
Planning Regions, Administrative Regions
and Administrative Districts



identification of areas within each District where a program interest existed, followed by the setting of priorities where interests overlapped.

Within each District, this process could have led to several different directions for timber management. In certain areas of the District, an area of exclusive use might have been identified, such as a provincial park; in such areas, timber management would not be permitted. Other areas may have been identified as having a priority use for a program other than timber management, such as a lake important for its fishery, or an area important to the tourism industry. In such cases, the program interest was noted as having priority, and the overlapping interest of timber management would be dealt with through special consideration during timber management planning.

The process of land use planning may also have resulted in areas identified for their importance to the Forest Resources Program. The priority of these areas was noted, and if there were overlapping interests of other programs, these interests would also be examined in detail through timber management planning. For large areas of many Districts, special program interests would not have been identified during land use planning, and specific priorities would not have been set. For these areas, timber management planning would proceed without pre-determined overlapping interests, but any such interests identified since land use planning would be dealt with through the detailed procedures of timber management planning.

In addition to sorting out some of the land use priorities at the District level, land use planning also takes a more detailed look at each of MNR's programs across a Planning Region and a District. For each MNR program, a set of guidelines provides general direction for resource management planning and on-the-ground activities. As an example, Dryden District's analysis of timber resources through land use planning led to a strong overall commitment to regeneration, with a stated direction of "pursuing the fullest forest regeneration program on cutover and untreated lands as is technologically and economically possible in order to perpetuate the continuous supply of forest products." This type of strategy provides guidance in the preparation of Timber Management Plans.

The detailed examination of each program also addresses the question of how much of a given resource is in demand for any District or Region, and how much is available from the existing land and water base. Each program addresses this question differently, according to the type of resource being examined and the type of information available. For MNR's Forest Resources Program, analyses are carried out at a District and Regional level to determine the industry's wood requirements, potential losses to fire, disease and insects, and the amount of wood available to be harvested - all projected for approximately 20 years. These analyses involve consideration of the best available sources of information. Normally, the best source is the data included in the most recent management plans for any management unit within the District. The results of the analyses are expressed as a numerical target for the District, and then in the form of strategies (similar to that noted in the preceding paragraph) to guide management planning and on-the-ground activity.

While land use planning provides certain guidelines to timber management, the key decisions of "if", "where", and "how" timber management will take place are made in the Timber Management Plan. Clearly, since these decisions are made at the management planning level, the preparation of those Timber Management Plans has been made the subject of this environmental assessment.

1.3 Policy

In addition to guidance from land use planning, timber management planning receives direction from policies formulated by Cabinet and policies established by the Ministry of Natural Resources. Three policies which have an important influence on timber management are: "sustained yield management"; "integrated resource management"; and the "Forest Production Policy".

Sustained Yield Management

In Ontario, Timber Management Plans are prepared and approved with "sustained yield" as an underlying principle. Simply stated, "sustained yield management" maintains an approximate balance between the growth of timber and the amount of timber depleted. In the Ministry's view, the

Legislature has acknowledged the value of sustained yield management in its reference to this principle in The Crown Timber Act.

Integrated Resource Management

Timber management also must be carried out in accordance with the policy of "integrated resource management". This is a policy established by the Ministry of Natural Resources which requires consideration of all interests when any decisions on resource use are made, regardless of the level of planning. This consideration occurs at the land use planning level, but is more refined at the resource management planning level. PART TWO, Chapter 2 describes in detail how the timber management planning process will take into account other interests, and thereby comply with the policy direction of "integrated resource management".

Forest Production Policy

In 1972, the Ontario Cabinet approved in principle a Forest Production Policy for Ontario. In formulating the policy, MNR projected demands for wood to the year 2020, and estimated what level of timber management was required in order to meet those projections. The policy which was approved provided direction for a level of regeneration that would ensure there would be at least 25.8 million cubic metres (9.1 million cunits) of wood available each year from Ontario's forests, in perpetuity - from 2020 onward.

MNR has established and maintains an implementation schedule which details how much renewal and maintenance must take place each year in order to achieve the 2020 target of a sustained yield of 25.8 million cubic metres of wood. The schedule specifies the kinds of activity needed (e.g., site preparation, planting, tending), and assigns the required amount of each activity to each MNR Region. In MNR's annual work planning and budget allocation process, each Region uses the implementation schedule as a guide.

The implementation schedule provides a means of monitoring the achievement of the target of the Forest Production Policy, and provides overall direction and control for renewal and maintenance activities. Although the actual

requirements for these activities will be determined for each management unit during the preparation of the Timber Management Plan, the implementation schedule allows co-ordination on a provincial basis, and focusses work planning and budget allocation onto activities and areas where it is most needed.

The annual provincial budget for renewal and maintenance is developed according to the implementation schedule determined by the Forest Production Policy. Funding allocations are, of course, dependent on the monies allocated by the Legislature for the Forest Resources Program each year. The level of the activities which can occur in any management unit in any given year, therefore, will be affected by the Forest Production Policy.

It should be noted, however, that the Forest Production Policy does not specify the long-term requirements for renewal and maintenance for a management unit. Those requirements are determined through application of the policy of "sustained yield management" when preparing Timber Management Plans.

In order to maintain the linkage between the provincial production target and renewal and maintenance requirements specified in individual plans, the implementation schedule is reviewed and updated periodically, based on information obtained from recently completed Timber Management Plans. Adjustments are then made to the implementation schedule to ensure that the overall production target of 25.8 million cubic metres for the year 2020 will be met.

1.4 Exclusions

Prior to undertaking the timber management planning process described in PART TWO, Chapter 2, the geographical extent of the management unit which will be the subject of a Timber Management Plan must be established. Certain lands within each management unit will not be available for timber management, because of present or future exclusive use for some other activity. These lands are identified as "exclusions" from the land area of the management unit for which a Timber Management Plan will be prepared.

Exclusions are comprised of:

- all patented (privately-owned) land;
- all lands owned and administered by the Federal Government, such as Indian Reserves, Department of National Defence Bases, National Parks;
- most provincial parks and approved provincial park candidates; and
- all Crown land leases, licences of occupation, land use permits, quarry permits, etc.

For Forest Management Agreement Forests (FMA's), all exclusions are legally described and excluded from the land area which is the subject of the FMA Agreement. Similarly, exclusions are removed from timber licences in Company and Crown Management Units.

The identification and geographical delineation of exclusions more specifically establishes where timber management may be carried out, (or more exactly where timber management will not be carried out), within each management unit. A Timber Management Plan is then produced for that "refined" land area

2. THE TIMBER MANAGEMENT PLANNING PROCESS

2.1 The Timber Management Plan

2.1.1 General

PART ONE, Chapter 9 describes alternative methods of carrying out timber management operations. The potential environmental effects of those alternative operations are described in PART ONE, Chapter 11. PART THREE, Chapter 1 discusses MNR's implementation manuals which have been developed in order to respond to those potential environmental effects. This chapter describes the planning process which, in the Ministry's view, will ensure that the potential environmental effects of operations are identified, and that operations are carried out in a manner which prevents, minimizes, or mitigates those environmental effects.

As described briefly in PART ONE, Chapter 4, a Timber Management Plan is produced for each management unit every five years. The plan is comprised of a 20-year projection, which establishes long-term direction for timber management activities for the management unit, and a five-year plan of operations, which outlines the details of operations to be undertaken during the next five years. At the end of that five-year term, a new plan is produced, extending the original 20-year projection for an additional five years, and outlining the details of operations to be undertaken during the next five-year term.

This process is repeated at regular five-year intervals, thereby ensuring that detailed planning of operations for each five-year term is always undertaken within the context of an updated long-term (i.e. 20-year) direction. The 20-year projection provides long-term continuity, while the regular five-year review of that long-term direction provides the opportunity to assess past performance and the flexibility to accommodate changes in circumstances.

Timber Management Plans are produced by MNR for Crown Management Units, and by individual forest companies for Company Management Units and Forest Management Agreement Forests (FMA's). All plans must be reviewed and

approved by MNR's senior management prior to the implementation of operations. Opportunities for the participation of interested organizations and individuals in the preparation of the Timber Management Plan for each management unit are provided each time a new plan is produced.

2.1.2 The Timber Management Planning Process

The planning process which will be applied in the production of the Timber Management Plan is outlined in FIGURE 2.1-1, and is described in detail in this section. The process incorporates the key elements of any planning process, such as data collection and analysis, establishment of objectives, consideration of options and rationalization of decisions. MNR's "Timber Management Planning Manual for Crown Lands in Ontario"¹ outlines the format for documentation of the planning process, and provides technical direction to MNR and forest company personnel responsible for the production of Timber Management Plans.

In practice, timber management planning, like most planning processes, may not take the simple direct linear form illustrated in FIGURE 2.1-1, or prove to be a regular progression through neatly defined stages as described in the following paragraphs. There will be constant feedback during planning in order that earlier decisions may be re-evaluated in light of later findings. The interrelated nature of the steps in the planning process requires that no one step can be dealt with independently; rather, the entire sequence of steps must normally be treated as a package.

Implementation of the planning process is undertaken/co-ordinated through MNR's District offices, with District Managers responsible for ensuring compliance with the requirements of the process in the production of all Timber Management Plans. For company-produced plans, the District Manager is responsible for ensuring a close liaison between MNR and company staff in plan production.

At the outset of the planning process, the District Manager appoints a multi-disciplinary team of MNR District staff to participate in the production of the plan. That team represents various programs including Forest Resources, Fish and

FIGURE 2.1-1

THE TIMBER MANAGEMENT PLANNING PROCESS

- STEP ONE:** **Assembly of Background Information**
- STEP TWO:** **Establishment of Management Objectives and Strategies**
- STEP THREE:** **Selection of Silvicultural System(s) and Rotation(s)/Cutting Cycle(s)**
- STEP FOUR:** **Determination of Maximum Allowable Depletion and Depletion Rate**
- STEP FIVE:** **Selection of Areas for, and Determination, of Operations**
- A. For 20-Year Period**
- (i) **Identification of Areas Eligible for Harvest, Renewal and Maintenance**
- (ii) **Preliminary Identification of "Areas of Concern"**
- (iii) **Determination of Type and General Location of Primary Access System**
- B. For 5-Year Term**
- (i) **Selection of Areas for Harvest, Renewal and Maintenance**
- (ii) **Identification of Specific "Areas of Concern"**
- (iii) **Determination of Operations**
- (a) **Harvest, Renewal and Maintenance Operations**
- **Normal Operating Areas**
- **"Areas of Concern"**
- (b) **Access**
- **Normal Operating Areas**
- **"Areas of Concern"**

Wildlife, Parks, Lands and Waters, and Fire Management. For Crown Management Units, the MNR Management Unit Forester is delegated responsibility for the production of the plan and acts as the co-ordinator of the planning team. For Company Management Units and FMA's, the District planning team, co-ordinated by an MNR Forester, provides assistance to the forest company which is responsible for production of the plan.

The individual members of the District planning team are responsible for ensuring that information from their respective program groups is contributed at the appropriate stages of the planning process, and that concerns of their respective programs are addressed. In addition, the District Manager may also assign specific responsibilities to individual team members to ensure that contributions from, and concerns of, interested external participants in the planning process are considered.

Members of the District planning team and forest company staff initially familiarize themselves with the management unit and the requirements of the timber management planning process. A specific schedule for the production, review and approval of the Timber Management Plan is then produced, in conformity with the requirements of the generic schedule outlined in FIGURE 2.1-2 (Refer to PART TWO, Section 2.1.3). For MNR-prepared plans, the schedule is produced by the District planning team. For company-prepared plans, the schedule is produced by the particular forest company involved, assisted by the District planning team. Upon establishment of the schedule, a public notice is issued, announcing commencement of the preparation of the Timber Management Plan for the management unit, and inviting all interested external participants to become involved in its preparation. A detailed description of the opportunities for public consultation in the preparation of the Timber Management Plan is presented in PART TWO, Section 2.1.3.

STEP ONE: ASSEMBLY OF BACKGROUND INFORMATION

The planning team commences the preparation of the Timber Management Plan by assembling background information for the management unit. At this stage, particular emphasis is placed on gathering information which contributes to the

determination of the 20-year projection and the detailed planning of operations for the next five-year term.

MNR's District Land Use Guidelines are a key information source, particularly in terms of their contribution to the establishment of the 20-year projection of the Timber Management Plan for each management unit in the District. The timber production targets in the District Land Use Guidelines, and the identification of land use areas with their associated land use intents, are fundamental considerations in the establishment of the 20-year projection.

Background inventory information assembled during District land use planning, and MNR's "Forest Resource Inventory (FRI)", serve as the principal sources for the assembly of a geographically-based data bank (i.e. an environmental data base) for the management unit. That background information includes inventory data on natural resources such as soils, forest resources, mineral resources, fish and wildlife resources and recreational resources, as well as existing land uses. In some cases, more detailed inventory information may have been assembled since District land use planning through regular resource inventories undertaken by other MNR program groups. In addition, the plans of other ministries/agencies may also serve as sources of inventory information.

For timber management planning purposes, the most important inventory information source is the Forest Resource Inventory which provides the basic information about the timber resources of each management unit. Individual forest stands are described in terms of their tree species composition, age, height, stocking and site class. The publication entitled "Forest Inventory Procedure for Ontario"⁴ provides a comprehensive explanation of MNR's provincially-based forest resource inventory system.

The Forest Resource Inventory is the principal information source for the identification of the areas of the management unit in which timber management operations may take place during the 20-year period of the Timber Management Plan, and more specifically, the areas in which operations will take place during the next five-year term. Other natural resource data may contribute to the identification of where operations may/will be carried out, but the principal role of that data is to contribute to the determination of how

operations will be carried out, in recognition of those other natural resource features and values.

In the preparation of the Timber Management Plan, the background inventory information from the District Land Use Guidelines and any subsequent resource inventories which have been assembled are reviewed, and updated and augmented, as necessary. For each management unit, a new Forest Resource Inventory is produced every 20 years. However, the inventory is also regularly updated as a product of the normal record-keeping system for MNR's Forest Resources Program, and is therefore relatively current whenever required for use in the timber management planning process. Additional detailed inventory of other resources will be collected for the portion of the management unit in which operations are anticipated to take place during the 20-year period, and more specifically, the next five-year term, of the Timber Management Plan. In some cases, this may require original data collection.

(NOTE: The actual areas of the management unit in which operations may take place during the 20-year period of the Timber Management Plan, and will take place during the next five-year term, are not identified until STEP FIVE of the planning process (as outlined in FIGURE 2.1-1). However, a preliminary indication of the land area which will likely be the focus of operations can be made on the basis of the Forest Resource Inventory information and records of the areal extent of past operations. Ultimately, the regular five-year renewal of the Timber Management Plan will focus the requirements for additional detailed inventory of other resources. This refinement of the area for which inventories are required is possible because the areas where operations are likely to occur are identified as part of the 20-year projection. Detailed inventory assembly for the next Timber Management Plan, therefore, can literally commence immediately upon approval of the Timber Management Plan under preparation.)

In addition, inventory information may also be contributed by external participants in the planning process, in response to the initial public notice (Refer

to PART TWO, Section 2.1.3). For example, other government ministries/agencies, such as the Ministries of Citizenship and Culture (MCC), Northern Development and Mines (MND&M) and Tourism and Recreation (MTR), and interest groups, such as the Northern Ontario Tourist Outfitters (NOTO) and the Ontario Federation of Anglers and Hunters (OFAH), may contribute inventory information assembled by their organizations.

For each management unit, the MNR District planning team will be responsible for ensuring that a comprehensive environmental data base is assembled. Ultimately, the application of the planning process in the renewal of the Timber Management Plan at regular five-year intervals will result in the development of a regularly-updated, comprehensive environmental data base for the entire management unit.

STEP TWO: ESTABLISHMENT OF MANAGEMENT OBJECTIVES AND STRATEGIES

The objective of MNR's Forest Resources Program on Crown lands in Ontario is to provide for an optimum continuous contribution to the economy by forest-based industries, and to provide for other uses of the forest, through environmentally sound timber management practices.

As described in PART TWO, Chapter 1, MNR's District Land Use Guidelines provide direction for the Forest Resources Program in each District. This direction is important in the formulation of objectives and strategies for Timber Management Plans. The District Land Use Guidelines include production targets and accompanying management strategies which provide general direction as to how the targets may be achieved. In addition, they include strategies which provide direction for the achievement of the other components of the overall provincial objective.

In some District Land Use Guidelines, other refined objectives are stated. These specific objectives go beyond the provincial program objective, but remain within the overall intent of that broad objective. For example, the Bracebridge District Land Use Guidelines include the objective "to make the maximum contribution to the achievement of the provincial energy target".

In addition to the statements of objectives and strategies specifically related to the Forest Resources Program, the District Land Use Guidelines also contain various statements of "land use intent". These statements relate to specific geographic areas (i.e. land use areas) within the District, and are accompanied by a set of management guidelines for land use activities within each particular area. For example, in the Dryden District Land Use Guidelines, the following is a statement of "land use intent" for Land Use Area No. 5 - Gullwing Lake.

"The primary use of this area will be for resource extraction (timber harvesting and mineral exploration/extraction). However, it will occur in such a manner that the lake trout population in Gullwing Lake will not be jeopardized and the moose population will remain at its current high level."

In the preparation of the Timber Management Plan for each individual management unit, it is necessary to review the objectives, production targets and management strategies from the District Land Use Guidelines, as well as statements of "land use intent" for land use areas within the management unit. This review, in conjunction with additional specific information for the management unit, guides the establishment of the objectives, production target and management strategies of the Timber Management Plan.

The objectives which direct timber management operations on the management unit are normally taken directly from the District Land Use Guidelines. As previously described, this direction is presented in the District Land Use Guidelines in either the discussion of the objectives for the timber management program, or the statements of "land use intent".

If resource management plans for other MNR programs in the area of the management unit are also in place (e.g. a District Fisheries Management Plan), those plans are also examined to assist in the achievement of objectives for integrated resource management in the Timber Management Plan. Any plans of other ministries/agencies, such as the Ministry of Tourism and Recreation, the Ministry of Transportation and Communications and Ontario Hydro, are also reviewed.

The production target for the management unit for the 20-year period of the Timber Management Plan is based primarily on a forecast of the wood requirements of the various users of the timber resources from the management unit, and the available wood supply. The production target in the District Land Use Guidelines provides the general context for the production target for the management unit, and provides a broad measure of achievement for the District as a whole.

In the Timber Management Plan, strategies for the achievement of the production target for the management unit represent the specific approaches for management of the timber resources on that management unit. Some of these strategies are very broad in nature and have been established provincially or regionally. Examples of such broad strategies include: management of the forest in a manner which improves productivity and upgrades the quality of timber products; and promotion of the full utilization of the available timber resource.

Such broad strategies require further refinement in the preparation of the Timber Management Plan to more specifically direct operations on the management unit. For example, the broad strategy to promote full utilization of the available timber resource may be further refined by more specific strategies such as development of access roads into areas of mature or overmature timber, or application of an accelerated depletion rate in order to harvest overmature timber with a minimum of further deterioration. The broad strategy to improve productivity may also be refined in the Timber Management Plan by more specific strategies such as application of intensive management practices on the best sites, conversion to more productive species, or use of only genetically-improved planting stock.

The other component of the overall provincial objective - "to provide for other uses of the forest," is addressed at the District level of planning by compliance with the policy of "integrated resource management". Strategies which address this policy in the District Land Use Guidelines are further refined in the Timber Management Plan through the application of the planning process discussed in this chapter. This comprehensive planning process provides for the integration of other resource values in timber management, primarily through the

participation of the multi-disciplinary planning team and opportunities for public consultation in the preparation of the Timber Management Plan. Decisions on the timber management practices which will be employed to achieve the overall provincial objective in an environmentally sound manner are made, not at the District level, but at the management unit level. Those decisions are made in the preparation of Timber Management Plans. MNR's implementation manuals (Refer to PART THREE, Chapter 1) contribute to those decisions and guide the implementation of operations.

The specific management strategies which are developed for the management unit will guide operations for the 20-year period of the Timber Management Plan, and establish the framework within which the remaining steps of the timber management planning process are undertaken.

STEP THREE: SELECTION OF SILVICULTURAL SYSTEM(S) AND ROTATION(S)/CUTTING CYCLE(S)

The principal means by which the production objectives for the management unit are realized is through the implementation of silvicultural systems of timber management. As described in PART ONE, Chapter 9, there are three silvicultural systems in use in Ontario: the clear cut, the shelterwood and the selection silvicultural systems. Each of these systems is normally associated with specific tree species, site conditions and end-product requirements.

An appropriate silvicultural system is selected for each "working group" or "forest unit". A working group is defined as an aggregate of forest stands having the same predominant species, while a forest unit is defined as an aggregate of forest stands having the same predominant species, further differentiated by site conditions.

In the selection of the silvicultural system(s), the following factors are taken into consideration: the existing tree species; the age-class distribution; the end-product requirements (e.g. pulpwood, sawlogs, veneer, etc); the desired composition of the future forest (i.e. same species versus different species); and the desired age structure of the future forest (i.e. even-aged versus uneven-aged). In addition, MNR's Silvicultural Guides (Refer to PART THREE, Chapter 1)

provide direction for the selection of appropriate silvicultural system(s) for specific working groups/forest units.

A related consideration in the selection of the silvicultural system(s) is the determination of the "rotation"/"cutting cycle". The rotation, which applies to even-aged management systems (e.g. the clear cut silvicultural system), is the planned number of years between complete harvests of successive forest crops on the same land area. For most tree species in Ontario, the rotation is normally at least 80 years. The cutting cycle, which applies to uneven-aged management systems (e.g. the selection silvicultural system), is the planned period between partial harvests on the same land area. Normally, the cutting cycle is in the order of 15 to 20 years. The determination of rotation/cutting cycle is normally based on established provincial or regional standards, although modifications to reflect local conditions may be made.

For each working group/forest unit, alternative methods of carrying out harvest, renewal and maintenance operations for the selected silvicultural system(s) are also described in a set of "silvicultural ground rules". This set of silvicultural ground rules represents the prescriptions of "normal operations" which will usually apply in the management of those working groups/forest units. The ground rules describe optional methods which can be employed on the particular management unit, and silvicultural specifications and standards which must be followed.

The information sources for the identification of those alternative methods which can be employed on the particular management unit include:

- the description of alternative methods presented in PART ONE, Chapter 9;
- MNR's silvicultural guides for various working groups (Refer to PART THREE, Chapter 1); and
- for existing Forest Management Agreement Forests (FMA's), the silvicultural ground rules which were developed in the negotiation of the FMA Agreements, and which are formally included in those agreements.

STEP FOUR: DETERMINATION OF MAXIMUM ALLOWABLE DEPLETION AND DEPLETION RATE

The Maximum Allowable Depletion is the calculated amount of land area within the management unit from which timber may be depleted over a five-year term, by any means, including harvest, fire, insect and disease infestations, or allocation to other uses. The Maximum Allowable Depletion represents the basis for regulation of the forest to achieve the long-term production objectives.

The Forest Resource Inventory (FRI) provides the statistical data base for the calculation of the Maximum Allowable Depletion. The specific portion of that data base which is utilized is the "production forest" component of the "productive forest lands", as classified in the Forest Resource Inventory. The calculation is applied to individual working groups/forest units and involves the application of specific mathematical formulae for individual silvicultural systems. The formulae incorporate the variables of area, age and time. The area and age variables are obtained directly from the Forest Resource Inventory; the time variable is represented by the rotation/cutting cycle for the particular working group/forest unit.

A comprehensive explanation of the calculation of the Maximum Allowable Depletion, including the specific formulae for individual silvicultural systems, is presented in APPENDIX B of the "Timber Management Planning Manual for Crown Lands in Ontario".¹

Concurrent with the calculation of the Maximum Allowable Depletion, a forecast is made of the wood requirements of the various users of the timber resources from the management unit. That forecast of both tree species and end-product requirements is based on historical records (normally, records of wood utilization for the past five years), projections of current trends, and predictions of future markets.

"Depletion rates" are then determined for each working group/forest unit by attempting to balance forecast wood requirements with the Maximum Allowable Depletion. If forecast requirements are lower than the Maximum Allowable Depletion there will be a surplus; if forecast requirements are higher,

there will be a deficit. Deficits are not normally met by exceeding the Maximum Allowable Depletion, but rather by obtaining additional wood requirements from elsewhere (e.g. surplus from adjacent management units, private lands, etc.)

STEP FIVE: SELECTION OF AREAS FOR, AND DETERMINATION OF, OPERATIONS

The area of the management unit on which timber management operations will be carried out is identified in a preliminary way for the 20-year period, and specifically for the next five-year term. The planning of operations themselves is undertaken for the area specifically selected for operations for the next five-year term only.

A. TWENTY-YEAR PERIOD

For the 20-year period of the Timber Management Plan, the land area of the management unit on which harvest, renewal and specified maintenance operations (i.e. tending only) may be carried out is identified. Within that land area, areas of value to other Crown land resource users/uses, including other MNR programs and external participants in the planning process, are also identified in a preliminary way. The combination of those two pieces of information contributes to the determination of the general location(s) of the primary access system required for the 20-year period.

(NOTE: Because of the unpredictable nature of insect and disease infestations, the land area of the management unit on which protection operations may be required can only be identified for the next five-year term. Therefore, in describing maintenance operations for the 20-year projection, only the tending component of the maintenance activity is discussed.)

(i) IDENTIFICATION OF AREAS ELIGIBLE FOR HARVEST, RENEWAL AND MAINTENANCE (for 20-year period)

Although for the most part integrally related, areas eligible for harvest, renewal and tending operations during the 20-year period of the Timber Management

Plan are identified separately on the basis of criteria specifically established for the management unit.

Identification of Areas Eligible for Harvest – The land area of the management unit which is eligible for harvest during the 20-year period of the Timber Management Plan is identified by using the forest stand maps and ledger data of the Forest Resource Inventory (FRI). Individual forest stands are identified on Forest Resource Inventory maps as eligible for harvest, primarily on the basis of maturity. Additional eligibility criteria may include quality, proximity to existing access systems and salvage requirements. Stands are selected from the "production forest" component of the "productive forest lands", as classified in the Forest Resource Inventory.

Identification of Areas Eligible for Renewal and Tending – The land area of the management unit which is available for renewal and tending operations during the 20-year period of the Timber Management Plan comprises the entire land area eligible for harvest during the same 20-year period, **PLUS** land areas which were harvested during previous plan periods, but which have not yet been satisfactorily renewed or tended. The latter areas are commonly referred to as the "NSR area", which is determined from records and through MNR's "Not Satisfactorily-Regenerated (NSR)" surveys. The "NSR area" includes land areas which:

- were harvested or otherwise depleted during previous plan periods, but not renewed (i.e. site prepared and regenerated); and
- were renewed during previous plan periods, but have not yet achieved "Free-to-Grow" status.

The new land area which becomes available for renewal during the 20-year period of the Timber Management Plan is determined from the depletion rate previously determined in **STEP FOUR** of the planning process. The new land area which becomes available for tending during the 20-year period of the plan depends on the rate of renewal of forest stands which will require regeneration release, and for areas managed under the selection and uniform shelterwood silvicultural systems, the amount of stand improvement required.

The determination of the renewal and tending requirements for the management unit involves consideration of such factors as:

- the management strategies for the management unit, as previously determined in STEP TWO of the planning process;
- priorities in terms of sites for intensive management, and
- expected returns on investments.

On the basis of those renewal and tending requirements, and additional criteria such as the possibilities for natural regeneration and site protection requirements, the land area of the management unit which is eligible for renewal and tending during the 20-year period of the Timber Management Plan is identified. Normally, that land area is identified on the same Forest Resource Inventory maps on which stands which are eligible for harvest are identified.

(ii) PRELIMINARY IDENTIFICATION OF AREAS OF CONCERN (for 20-year period)

In the timber management planning process, concerns of other Crown land resource users/uses regarding timber management operations are addressed primarily through the identification of, and detailed planning of operations within, areas in which other resource values exist. Such areas, termed "areas of concern", are defined as:

"geographically-defined areas of value to other users/uses which could be affected by timber management operations, including roads, and which may require modifications to those operations."

Preliminary areas of concern are identified within the areas eligible for operations during the 20-year period of the Timber Management Plan, using the background information assembled in STEP ONE of the planning process. As part of the preliminary identification of areas of concern, an accompanying description of the resource values which require protection in each area is also

produced. Contributions from other MNR program groups and interested external participants are particularly important at this step of the planning process.

In addition, preliminary areas of concern may also be identified in other parts of the management unit where new primary access roads are required to provide access to areas eligible for operations.

The preliminary identification of areas of concern serves as the initial indication that comprehensive planning of timber management operations in those areas will be required, if and when that land area is selected for operations during a five-year term. Perhaps most importantly, however, the preliminary identification of areas of concern serves as a major contribution to the determination of the general location(s) of the primary access system required for the 20-year period of the Timber Management Plan.

(iii) DETERMINATION OF THE TYPE AND GENERAL LOCATION OF PRIMARY ACCESS SYSTEM (for 20-year period)

Accessibility is critical to timber management on a management unit. The type of access system normally used in Ontario is a road network, although there are situations where a combination of roads and rivers/lakes or railways is used, primarily for the transportation of roundwood from the management unit to wood-processing facilities.

Development of a new permanent road network to provide access to and from new areas of harvest operations, and on occasion, renewal and maintenance operations, is normally required. That permanent road network represents the primary access system for the management unit. The planning of the new primary access system is undertaken in two stages:

- a broad corridor planning stage for primary access roads required for the 20-year period of the Timber Management Plan, and
- detailed planning of the location of each primary access road which is required for the next five-year term.

For each primary access road required for the 20-year period of the Timber Management Plan, a general road location (i.e. a corridor of approximately 1 km width) must be determined. The determination of that general location for each required primary access road involves.

- consideration of alternative corridors;
- a broad environmental evaluation and comparison of those alternative corridors, and
- the ultimate selection of a preferred/most acceptable corridor.

The identification of alternative corridors for each required primary access road incorporates consideration of the preliminary areas of concern, normally by attempting to avoid, or minimize intrusion into, those areas. On occasion, however, a decision may be made to identify and ultimately select a suitable corridor within such areas.

The broad environmental evaluation and comparison of the alternative corridors addresses three major criteria:

- effectiveness of access to all areas eligible for harvest, renewal and tending operations;
- accommodation of preliminary areas of concern; and
- estimated construction, transportation and maintenance costs.

An additional consideration which could contribute to the analysis of the alternative corridors involves "use management strategies". For primary access roads, use management strategies would normally consist of mechanisms to control use, such as restrictions on use or various forms of road closure. MNR's "Resource Access Roads Policy and Implementation Strategies and Guidelines"³ provide a comprehensive description of the requirements for use management strategies for access roads.

The results of the analysis of the alternative corridors provide the basis, and the supporting rationale, for the selection of the preferred/most acceptable corridor for each required primary access road.

B. FIVE-YEAR TERM

For the five-year term of the Timber Management Plan, the land area of the management unit on which harvest, renewal and tending operations will be carried out is selected. Within that land area, specific areas of concern to other Crown land resource users/uses which require special consideration in the planning of operations are identified. Operations which will be carried out in all areas selected for operations for the five-year term are then determined, with comprehensive planning requirements for specific "areas of concern".

(NOTE: Because of the unpredictable nature of insect and disease infestations, only the land area on which protection operations may be carried out, if required, during the next five-year term, can be identified. The determination of the actual protection operations which will be carried out involves annual planning requirements as described in APPENDIX III.)

(i) SELECTION OF AREAS FOR HARVEST, RENEWAL AND MAINTENANCE (for five-year term)

From the land area of the management unit which was identified as eligible for harvest, renewal and tending operations during the 20-year period of the Timber Management Plan, specific areas are selected separately for harvest, renewal and tending during the next five-year term.

Selection of Areas for Harvest – From the areas previously identified on Forest Resource Inventory (FRI) maps as eligible for harvest during the 20-year period of the Timber Management Plan, individual forest stands are selected for harvest during the next five-year term. Stands are selected on the basis of a refined set of selection criteria which is specifically established for the management unit. That set of criteria normally includes the following principal considerations: maturity, quality, accessibility and operability. The total area selected for harvest during

the next five-year term must be consistent with the depletion rate previously established in STEP FOUR of the planning process.

Selection of Areas for Renewal and Maintenance – From the areas previously identified on Forest Resource Inventory (FRI) maps as eligible for renewal and tending operations during the 20-year period of the Timber Management Plan, individual project areas are selected for renewal and tending during the next five-year term.

As previously discussed, because of the unpredictable nature of insect and disease infestations, it is not possible to define specifically the land areas on which protection operations will be carried out during the next five-year term. However, areas eligible for protection operations, if required, during the next five-year term of the Timber Management Plan are identified, on the basis of a set of selection criteria which defines "commercially operable" and "high value" forests, as well as other forest stands of high commercial value. "Commercially operable" forests normally comprise all forest stands which are eligible for harvest in the short-term future (e.g. during the next 10 years). "High value" forests include seed production and seed collection areas, research areas, gene pools, and areas of regeneration less than 20 years old.

(ii) IDENTIFICATION OF SPECIFIC AREAS OF CONCERN (for five-year term)

Specific areas of concern are identified within the areas selected for operations during the next five-year term, primarily through refinement (and, if required, expansion) of the preliminary identification of areas of concern for the 20-year period of the Timber Management Plan. Detailed background information previously assembled in STEP ONE of the planning process is used in the identification of those specific areas of concern and the accompanying description of the resource values which require protection in each area. Contributions from other MNR program groups and interested external participants are particularly important at this step of the planning process.

The identification of specific areas of concern may influence the selection of areas for harvest, renewal and tending operations, through the normal feedback mechanism within the planning process. Most importantly, however, the

identification of specific areas of concern specifies those areas in which comprehensive planning of timber management operations is required.

Specific areas of concern are also identified within those portions of primary access road corridors, previously established for the 20-year period of the Timber Management Plan, in which more precise locations of the primary access roads which are required during the next five-year term must be determined. The identification of specific areas of concern within the primary access road corridors serves as a major contribution to the refinement of the road locations within the corridors, with comprehensive planning requirements if the roads must traverse specific areas of concern, as described in APPENDIX II.

In addition, specific areas of concern may also be identified in other parts of the management unit through which new secondary access roads may be required during the next five-year term.

(iii) DETERMINATION OF OPERATIONS (for five-year term)

For the areas selected for operations during the next five-year term, a two-tiered approach to the planning of timber management operations is employed. That two-tiered approach involves general planning requirements for areas outside of specific areas of concern, hereafter termed "normal operating areas", and comprehensive planning requirements for specific areas of concern. The planning of harvest, renewal and tending operations, and the planning of access road locations, are addressed separately within those two types of areas.

For normal operating areas, general locations (i.e. corridors of approximately 500 m width) are determined for required primary and secondary access roads. In addition, prescriptions are produced for "normal" harvest, renewal and/or tending operations which will be carried out. More precise road locations and detailed prescriptions for operations within normal operating areas are determined annually in the production of the Annual Work Schedule.

For specific areas of concern, precise locations (i.e. maximum 10³ m width) for required primary and secondary access roads and any necessary conditions on tertiary access roads are normally determined. In addition, detailed prescriptions

are normally produced for the harvest, renewal and/or tending operations which will be carried out. Those precise road locations and detailed operational prescriptions are determined through the application of a comprehensive planning process. The process is applied to individual areas of concern, or types of associated areas of concern, such as shorelands of lake trout lakes and deer yards.

That comprehensive planning process initially requires that the following question must be answered:

"Can timber management operations be carried out, while protecting the other identified resource values?"

If the answer to that question is "NO", the area of concern, or a part thereof, will normally become a reserve in which no timber management operations will be permitted.

If the answer to that initial question is "YES", the following second question must be answered:

"If operations can be carried out, how can they proceed (i.e. in the normal manner employed elsewhere in the management unit, OR with specific modifications)?"

The answer to the second question may be any of the following:

- specific access provisions are necessary to protect the other identified resource values, which could mean precise primary and secondary access road locations, use management strategies, and/or conditions on tertiary access roads;
- normal operations can be carried out and still protect the other identified resource values; or
- modifications to normal operations are required to protect the other identified resource values.

It is recognized that it may not often be possible to answer the initial question without addressing the second question, in that a decision on whether or not operations can be carried out may be largely dependent on how they can proceed. In addition, there may be situations in which the answer to the initial question may be that timber management operations will proceed, even though complete protection of the other identified resource values may not be ensured. In such situations, comprehensive justification of decisions to proceed with operations must be produced, and the question of how they can proceed must be answered.

It is also recognized that, for any individual area of concern, the product of the comprehensive planning process will not normally be a decision on only one of the four basic operational options (i.e. reserve, specific access provisions, normal operations or modified operations). Rather, the planning process will commonly involve consideration and analysis of various combinations of those options, with ultimate decisions on:

- an acceptable combination of options;
- a precise location and associated use management strategy for each required primary and secondary access road, and conditions on tertiary access roads; and
- a suitable modified prescription for those portions of the area of concern in which modified operations are required.

The following discussion provides a description of the planning requirements, and resultant products of the planning process in the five-year plan of operations, for:

- (a) harvest, renewal and/or tending operations, and
- (b) access roads.

For each of those categories of operations, general planning requirements for normal operating areas and comprehensive planning requirements for specific areas of concern are described.

(iii) (a) Harvest, Renewal and Tending Operations

Normal Operating Areas – In the preparation of the five-year plan of operations, detailed prescriptions for operations within normal operating areas are not determined. Rather, the set of silvicultural ground rules previously produced in STEP THREE of the planning process will serve as prescriptions of "normal operations" for those areas. That set of silvicultural ground rules describes optional methods for carrying out harvest, renewal and tending operations on the particular management unit, and silvicultural specifications and standards which must be followed. Detailed prescriptions for operations within normal operating areas are determined annually in the production of the Annual Work Schedule.

Areas of Concern – In the planning of operations for individual areas of concern, or types of associated areas of concern, it may be determined that normal operations can be carried out and still protect the other identified resource values. In such cases, no further detailed planning is undertaken in the preparation of the five-year plan of operations. The area of concern, or a part thereof, essentially becomes part of the adjacent normal operating areas, with the same requirements for planning of operations. In such situations, comprehensive justification of decisions to proceed with normal operations must be produced.

If, however, it is determined that modifications to normal operations are required to protect the other identified resource values, a comprehensive planning procedure must be followed, as described in APPENDIX I. That planning procedure requires consideration of alternatives for harvest, renewal and/or tending operations, with treatment of alternative packages of required operations as the alternative modified practices. A comprehensive evaluation and comparison of the potential environmental effects of the alternative modified practices is required, with the results of that analysis providing the basis, and supporting rationale, for the selection of the preferred/most

acceptable modified management prescription for the individual area of concern, or type of associated areas of concern.

As discussed in PART THREE, Chapter 1, MNR has produced a number of guidelines for timber management operations in various types of areas of concern (e.g. fisheries habitat, moose habitat and areas of tourism value). These guidelines provide information on alternative modified practices which could be employed to protect particular resource values. In addition, MNR's Silvicultural Guides (Refer to PART THREE, Chapter 1) serve as additional sources of information for the determination of alternative modified management prescriptions.

(iii) (b) Access

Planning of access roads which are required during the next five-year term of the Timber Management Plan involves

- the second stage of planning of locations for primary access roads;
- planning of locations for secondary access roads which normally provide access within areas selected for operations;
- development of "use management strategies" for each primary and secondary access road; and
- determination of any necessary conditions on locations, construction and use of tertiary access roads

The planning of primary and secondary access roads involves general planning requirements in normal operating areas (i.e. determination of corridors of approximately 500 m in width), and comprehensive planning requirements in specific areas of concern, as described in APPENDIX II. Those comprehensive planning requirements involve consideration of alternative precise locations (i.e. maximum 100 m width) for each required primary and secondary access road within specific areas of concern, and the ultimate selection, with supporting rationale, of a preferred/most acceptable location.

For secondary access roads, the determination of an alignment for the total length of each road requires consideration of alternative total alignments. Each alignment would comprise a corridor of approximately 500 m width in normal operating areas, and a precise location (i.e. maximum 100 m width) within specific areas of concern. Similar to the analysis of alternative corridors for primary access roads for the 20-year period of the Timber Management Plan, an analysis of alternative total alignments for each required secondary access road provides the basis, and supporting rationale, for the selection of a preferred/most acceptable total alignment. That analysis includes an environmental evaluation and comparison of alternative total alignments, and consideration of use management strategies.

For each primary and secondary access road, a "use management strategy" is also developed. The strategy will be based primarily on requirements for the protection of other resource values in those specific areas of concern traversed by, and/or in the vicinity of, the particular road. Various options for managing the use of access roads must be considered (e.g. road closure under the authority of The Public Lands Act, restrictions to specific classes of vehicles, non-maintenance or abandonment after the intended use of the road has been fulfilled). The procedure for the determination of use management strategies is outlined in MNR's "Resource Access Roads Policy and Implementation Strategies and Guidelines" 5.

The following discussion provides a description of the planning requirements, and resultant products of the planning process in the five-year plan of operations, for access roads in both normal operating areas, and specific areas of concern.

Normal Operating Areas – In normal operating areas, the previously-established general location of each primary access road which is required during the 20-year period of the Timber Management Plan (i.e. a corridor of approximately 1 km width) is refined to a corridor of approximately 500 m width for that portion of the primary access road which is required during the next five-year term. That refinement will involve consideration of specific areas of concern which have

been identified within the previously-established 1 km corridor, by avoiding those areas.

For those portions of secondary access roads in normal operating areas, general road locations (i.e. corridors of 500 m width) are also determined. The determination of those road corridor locations will involve consideration of specific areas of concern by avoiding those areas.

Areas of Concern – For those portions of primary and secondary access roads which traverse specific areas of concern, precise road locations (i.e. maximum 100 m width) must be determined in accordance with the comprehensive planning procedure described in APPENDIX II. That planning procedure requires:

- consideration of alternative precise road locations (i.e. maximum 100 m width) for each required road within each specific area of concern;
- a comprehensive evaluation and comparison of the potential environmental effects of those alternative precise road locations; and
- the ultimate selection of a preferred/most acceptable location for each required road.

The results of the analysis of the alternatives provides the basis, and the supporting rationale, for the selection of the preferred/most acceptable road location.

In addition, there are planning requirements for tertiary access roads within specific areas of concern in the five-year plan of operations. Those planning requirements do not require the determination of precise locations for required tertiary access roads, but rather focus on the identification of:

- portions of the specific area of concern in which no tertiary access roads will be permitted; and/or
- portions of the specific area of concern in which special practices are required, such as special construction practices, specified seasons of use

(e.g. winter only), mechanisms to control use, and immediate removal upon completion of timber management activities.

2.1.3 Public Consultation and MNR's Review and Approval Process

2.1.3.1 General

Formal opportunities for the participation of other government ministries and agencies, municipalities, interest groups, local native communities and individual members of the public are provided at various stages in the timber management planning process. These opportunities for public consultation are integrated into a comprehensive schedule for the production, review and approval of a Timber Management Plan and represent minimum requirements which must be met. Additional opportunities may be provided if the need arises during the planning process.

All public consultation activities in the preparation of a Timber Management Plan will be co-ordinated through the MNR District office. MNR's Regional Offices or Main Office will provide annually a list of all plans to be prepared during that year to any interested external participants who request this information. Those participants will be directed to the appropriate MNR District office for any future involvement in the preparation of a Timber Management Plan for a specific management unit.

2.1.3.2 Responsibilities

MNR is responsible for all aspects of the public consultation program in the preparation of Timber Management Plans for Crown Management Units. In the preparation of plans for Company Management Units and Forest Management Agreement Forests (FMA's), MNR and the particular forest company involved share the responsibility. MNR assumes the lead role for ensuring that all formal opportunities for public consultation are provided (i.e. issuance of public notices and provision of facilities for public reviews). The forest company participates in all stages of public consultation and is responsible for ensuring that all comments and submissions from interested participants are considered in the preparation of the Timber Management Plan.

2.1.3.3 Production, Review and Approval of a Timber Management Plan

FIGURE 2.1-2 outlines the generic schedule for the production, review and approval of a Timber Management Plan. The schedule normally covers a 12 to 14 - month period, providing:

- a six to eight-month period for production of a draft Timber Management Plan; and
- a six-month period for the formal MNR review and approval process.

The schedule provides time periods for each step in the formal MNR review and approval process, and for responses from interested external participants for each public consultation opportunity.

The five-year term of application of the Timber Management Plan commences on the first day of April of the year in which a new approved plan must be in place. The schedule, therefore, requires submission of a draft Timber Management Plan by the first day of October of the previous year to provide for the minimum requirements of the formal MNR review and approval process. If the MNR District planning team or individual company responsible for the preparation of the Timber Management Plan wishes to provide additional time for the formal MNR review and approval process, or for public consultation, the specific schedule which they are required to produce at the commencement of the planning process must ensure that the draft Timber Management Plan is submitted at an earlier date.

Four formal opportunities are provided for public consultation in the preparation of the Timber Management Plan:

- an INVITATION TO PARTICIPATE, at the outset of the timber management planning exercise;

Figure 2.1-2

Schedule: Timber Management Plan Production, Review and Approval



- an opportunity to REVIEW preliminary proposals at an INFORMATION CENTRE, prior to production of the draft Timber Management Plan;
- an opportunity to REVIEW the draft Timber Management Plan; and
- an opportunity for INSPECTION of the approved Timber Management Plan.

A description of each of the formal opportunities for public consultation is presented in the following discussion of the schedule for the production, review and approval of a Timber Management Plan.

INVITATION TO PARTICIPATE – At the commencement of the preparation of the Timber Management Plan, the MNR District Manager will issue a public notice announcing that a Timber Management Plan will be prepared for the management unit, and inviting interested external participants to become involved in the planning process.

The public notice will normally be in the form of:

- direct written invitations to local and regional offices of relevant government ministries or agencies, municipalities, interest groups and individual members of the public with a known interest in timber management planning for the management unit; and
- general public notices, usually in the form of paid public advertisements in the local media, advising the general public of the opportunity to become involved.

Direct verbal communication may serve as an alternate form of notification, where appropriate.

The public notice will include:

- a map of the management unit for which the Timber Management Plan will be prepared;

- a summary of the schedule of the planning process; and
- an outline of the subject matter to be covered by the plan (normally the harvest, renewal and maintenance operations, consideration of concerns of other users/uses of the forest, and the locations of roads).

The public notice will invite interested participants to offer comments on any aspect of the upcoming plan, and will specifically direct their attention to

- providing additional background information on the management unit;
- identifying areas which contain values that might be affected by timber management operations; and
- stating issues or concerns which need to be addressed during the planning process.

A period of thirty (30) days is provided for interested participants to respond to the INVITATION TO PARTICIPATE.

PUBLIC REVIEW - INFORMATION CENTRE – Prior to the production of a draft Timber Management Plan, the District Manager will issue a second public notice, inviting interested external participants to an INFORMATION CENTRE to review, and comment on, alternatives and preliminary proposals which have been developed. This public notice will normally be issued four to five months after the initial INVITATION TO PARTICIPATE, and must be issued at least 15 days in advance of the date of the INFORMATION CENTRE.

The public notice will normally be in the form of:

- direct written invitations to all parties/persons who received a written INVITATION TO PARTICIPATE, and any other parties/persons who have declared an interest since the initial public notice; and

- general public notices, usually in the form of paid public advertisements in the local media, advising the general public of the opportunity to review preliminary proposals at the INFORMATION CENTRE.

Direct verbal communication may serve as an alternate form of notification, where appropriate.

This second public notice will include the same descriptive material as the initial INVITATION TO PARTICIPATE, and will inform interested participants that the INFORMATION CENTRE provides an opportunity to review, and comment on, the alternatives and preliminary proposals which have been developed, before decisions are made.

At the INFORMATION CENTRE, members of the MNR District planning team will be present to explain developments in the planning process and respond to any inquiries. For company-prepared Timber Management Plans, developments in the planning process will be explained primarily by company staff, with MNR staff available in a support role.

Although a broad array of information will be provided at the INFORMATION CENTRE in the form of maps, displays and written material, the following information must be available, and is expected to be the principal focus of attention:

- maps which identify areas eligible for operations for the 20-year period of the plan, and the specific areas of operations for the next five-year term;
- maps which identify specific areas of concern to other Crown land resource users/uses;
- maps which identify alternatives, and preliminary proposals, for:
 - broad corridors for primary access roads for the 20-year period of the plan; and

- more precise locations of primary and secondary access roads required during the next five-year term;
- the analysis of the alternative access road locations; and
- the analysis of, and preliminary proposals for, operations within specific areas of concern.

The minimum requirement for the INFORMATION CENTRE is a one-day opportunity at a convenient location. A period of thirty (30) days after the date of the INFORMATION CENTRE is provided for interested participants to present submissions regarding concerns with the preliminary proposals for the draft Timber Management Plan.

It is recognized that all interested participants may not be able to attend the INFORMATION CENTRE. Therefore, the preliminary proposals for the draft Timber Management Plan will be available for public review at the MNR District office for a period of thirty (30) days after the date of the INFORMATION CENTRE. Members of the MNR District planning team will be available to explain developments in the timber management planning process and respond to any inquiries.

It is also recognized that additional areas of concern to other Crown land resource users/uses may be identified by interested participants during this stage of public consultation. If necessary, additional opportunities will be provided for those participants to review and comment on alternatives, and preliminary proposals, for road locations and/or operations within those areas of concern, prior to production of the draft Timber Management Plan.

PRODUCTION AND SUBMISSION OF THE DRAFT TIMBER MANAGEMENT PLAN -

After the thirty (30)-day review period, the draft Timber Management Plan will be produced and submitted for MNR review and approval. The due date for submission of the draft Timber Management Plan has been previously established in the specific schedule for the production of the plan, which normally provides a period of sixty (60) days for plan production.

Upon submission, the draft Timber Management Plan must be accompanied by supplementary documentation which describes the submissions which were received during public consultation and how they have been considered in the preparation of the draft plan. The supplementary documentation will also address the application of the comprehensive planning requirements for.

- access roads, and
- operations in specific areas of concern to other Crown land resource users/uses.

MNR REVIEW OF DRAFT TIMBER MANAGEMENT PLAN – Upon submission of the draft Timber Management Plan and accompanying supplementary documentation, MNR will undertake an internal review by the District, Region and Forest Resources Group, Main Office over a period of normally sixty (60) days. This review could be favourable, recommending approval of the draft plan as submitted, or unfavourable, culminating in a preliminary list of required alterations and the reasons for them. The Director, Timber Sales Branch, Forest Resources Group, Main Office will forward this list to the District Manager, and for company-prepared plans, to the particular forest company involved.

PUBLIC REVIEW OF DRAFT TIMBER MANAGEMENT PLAN – Upon completion of the MNR internal review of the draft Timber Management Plan and accompanying supplementary documentation, the District Manager will issue a public notice inviting interested external participants to review the draft plan, supplementary documentation, and MNR's preliminary list of required alterations, if any. This public review will take place prior to approval of the draft plan or, if required, production of a revised plan.

The public notice will be in the form of:

- direct written invitations to all respondents to the initial INVITATION TO PARTICIPATE, and all visitors to the INFORMATION CENTRE; and
- general public notices, usually in the form of paid public advertisements in the local media, advising the general public of the opportunity to review

the draft Timber Management Plan, accompanying supplementary documentation, and MNR's preliminary list of required alterations, if any.

Direct verbal communication may serve as an alternate form of notification, where appropriate.

The public notice will inform interested participants that the draft Timber Management Plan is available for review at the MNR District office. That opportunity to review the draft plan will enable participants:

- to review how their earlier comments and submissions have been considered in the preparation of the draft Timber Management Plan;
- to comment on decisions which have been made; and
- to review, and comment on, MNR's preliminary list of required alterations, if any.

A period of thirty (30) days after the date of the public notice is provided for interested participants to review the draft Timber Management Plan at the MNR District office, and to present comments and submissions regarding proposed alterations.

After the thirty (30)-day review period, MNR will consider the submissions, and:

- (i) if no significant concerns are expressed or if concerns identified in the submissions cannot be accommodated, and MNR's internal review resulted in a recommendation to approve the draft plan as submitted, no alterations to the draft plan will be required; or
- (ii) if possible, MNR will incorporate suggested alterations into a final list of required alterations to the draft plan.

In the first case, the draft plan will then be approved jointly by the Director, Timber Sales Branch and the Regional Director.

In the second case, the final list of required alterations will be produced jointly by the MNR District, Region and Forest Resources Group, Main Office. The Director, Timber Sales Branch will forward this list to the District Manager, and for company-prepared plans, to the particular forest company involved. That final list of required alterations will normally be forwarded within fifteen (15) days of the final date for presentation of submissions.

PRODUCTION AND MNR REVIEW OF REVISED TIMBER MANAGEMENT PLAN – If alterations to the draft Timber Management Plan are required, a revised Timber Management Plan will be produced and submitted for MNR review and approval, accompanied by the required supplementary documentation. Normally, a period of thirty (30) days is provided for production of the revised Timber Management Plan, although the previously-established specific schedule for the production of the plan may have provided additional time. Upon submission of the revised Timber Management Plan and accompanying supplementary documentation, MNR will undertake an immediate internal review (by the District, Region and Forest Resources Group, Main Office) to ensure that the required alterations have been made. If the required alterations have been satisfactorily incorporated, the revised plan will be approved jointly by the Director, Timber Sales Branch and the Regional Director, normally within fifteen (15) days of the submission of the revised plan.

NOTIFICATION TO MINISTRY OF THE ENVIRONMENT – Upon approval of the Timber Management Plan by MNR senior management, the District Manager will notify the appropriate Regional Office, and the Environmental Assessment Branch, of the Ministry of the Environment, and will submit a summary of the MNR-approved plan for the Ministry of the Environment's public record files. The summary will include the following information:

- (i) the name of the management unit for which the Timber Management Plan was prepared, and the term of the plan;
- (ii) a map of the management unit covered by the plan, indicating the area of operations for the next five-year term;

- (iii) the nature of the comments received during public consultation in preparation of the plan; and
- (iv) the nature of MNR's response to those comments, as reflected in the MNR-approved plan.

PUBLIC INSPECTION OF THE APPROVED TIMBER MANAGEMENT PLAN – At the same time as the Ministry of the Environment is notified, the District Manager will issue a public notice advising interested external participants that the MNR-approved plan is available for inspection at the MNR District office.

The public notice will normally be in the form of:

- direct written notices to all previously identified participants, and all parties/persons known to be directly affected by timber management operations during the next five-year term; and
- general public notices, usually in the form of paid public advertisements in the local media, advising the general public of the opportunity for inspection of the MNR-approved plan.

Direct verbal communication may serve as an alternate form of notification, where appropriate.

The public notice will clearly indicate that the opportunity for inspection of the MNR-approved Timber Management Plan provides a final opportunity for interested participants to request a "Bump-up" of the Timber Management Plan, or a component part of the Timber Management Plan, to Individual Environmental Assessment status (Refer to PART TWO, Section 2.3). A thirty (30)-day period after the date of the public notice is provided for interested participants to pursue such a request. If a request is not received during that period, the MNR-approved Timber Management Plan automatically receives final approval. The final approved Timber Management Plan will remain available for public inspection at the MNR District office at any time during its five-year term.

2.1.4 Documentation

2.1.4.1 The Timber Management Plan

MNR's "Timber Management Planning Manual for Crown Lands in Ontario" ¹ outlines the format and content requirements for the documentation of the results of the timber management planning process in a Timber Management Plan. These requirements, as set out in Chapter 4 of the manual, represent the minimum content requirements for an acceptable Timber Management Plan, whether produced by MNR or a forest company.

2.1.4.2 Supplementary Documentation

The planning manual also sets out requirements for supplementary documentation which must accompany the Timber Management Plan through the formal review and approval process. That supplementary documentation will address public consultation in the preparation of the Timber Management Plan, and the application of the comprehensive planning requirements for:

- access roads; and
- operations in specific areas of concern to other Crown land resource users/uses.

Supplementary documentation of public consultation in the preparation of the Timber Management Plan will include:

- records of all public notices which were issued, and all comments and submissions which were received from interested external participants; and
- a summary of how those comments and submissions were considered, and where possible, incorporated in the preparation of the plan.

Supplementary documentation of the comprehensive planning requirements for individual access roads will include:

- a map which identifies the alternatives which were considered;
- a summary of the environmental evaluation and comparison of the alternatives;
- a summary of comments and submissions which were received from interested external participants; and
- the rationale for the selection of the preferred/most acceptable alternative, including the consideration of comments and submissions from interested participants in the selection.

This supplementary documentation is required for each primary access road corridor required for the 20-year period of the Timber Management Plan and each primary and secondary access road required during the next five-year term.

Supplementary documentation of the comprehensive planning requirements for operations within individual specific areas of concern will include:

- a map which identifies the specific areas of concern within the areas selected for operations during the next five-year term, and an accompanying description of the resource values which require protection in each area;
- the operational options which were considered for each individual area of concern, or each type of associated areas of concern, including alternative modified management prescriptions, where applicable;
- a summary of the environmental evaluation and comparison of the alternative modified management prescriptions, where applicable;
- a summary of comments and submissions which were received from interested external participants; and

- the rationale for the selection of the operational option(s) and, where applicable, the preferred/most acceptable modified management prescription(s), including the consideration of comments and submissions from interested participants in the selection.

2.1.5 Plan Renewal and Amendment

2.1.5.1 Plan Renewal

A new Timber Management Plan is produced for each management unit at the end of the five-year term. This scheduled renewal permits a regular review of the long-term direction of the plan, and provides the opportunity to assess past performance and the flexibility to accommodate changes in circumstances, such as changes in the land base and forecasts of wood requirements.

An unscheduled renewal of the Timber Management Plan may also be required if the plan is rendered obsolete at any time during its five-year term. Any catastrophe or change in circumstances which would cause the objectives which direct timber management operations on the management unit to become unattainable, or the management strategies to become inappropriate, would require the production of a new Timber Management Plan. For example, a large fire or insect infestation could require significant changes to the Timber Management Plan, requiring the selection of new areas of operations, and consequently, the determination of the operations which will be carried out in those new areas of operations.

Production of a new Timber Management Plan, whether as a scheduled or unscheduled renewal, requires:

- application of the entire timber management planning process, as described in PART TWO, Section 2.1.2;
- provision of all formal opportunities for public consultation, and application of the complete MNR review and approval process, as described in PART TWO, Section 2.1.3; and

- production of the Timber Management Plan and accompanying supplementary documentation in accordance with the documentation requirements described in PART TWO, Section 2.1.4.

If the new plan is an unscheduled renewal, the reasons for the unscheduled renewal must also be documented in the new plan.

2.1.5.2 Plan Amendment

Amendments to the approved Timber Management Plan may be required during its five-year term to permit changes which do not alter the intent of the plan (i.e. the objectives and management strategies remain the same, but specifics related to their achievement require modifications). If the MNR District planning team or forest company wishes to amend the Timber Management Plan, a preliminary explanation of the requirement for, and nature of, the proposed amendment must initially be submitted to the District Manager, who determines whether planning for the proposed amendment should be permitted to proceed. If the District Manager's decision is favourable, the planning, review and approval requirements for the amendment will depend on whether the proposed amendment is considered to be major or minor.

Minor Amendments

If the proposed amendment involves changes to operations within "normal operating areas", the amendment will be considered to be minor. Documentation of the requirement for, and nature of, the proposed amendment must be submitted to the District Manager who is authorized to approve minor amendments. The District Manager will notify the Regional Director and the Director, Timber Sales Branch of the nature of the minor amendment, and the approved amendment will be appended to the previously-approved Timber Management Plan.

Major Amendments

If the proposed amendment involves new areas of operations or changes to operations within previously-identified specific areas of concern, or would result

in significant reductions in wood supplies to users of the timber resources from the management unit, the amendment will be considered to be major. For major amendments, specific planning and public consultation requirements will apply. The extent of these requirements will depend on the nature of the amendment.

The planning requirements, in particular, will depend on the nature of the proposed amendment. For example, if the amendment involves new areas of operations, the full requirements of STEP FIVE of the timber management planning process for the five-year plan of operations will apply. However, if the amendment involves a new primary or secondary access road, or changes to approved primary or secondary access road locations within specific areas of concern, only the planning requirements for access roads, as described in STEP FIVE of the planning process, will apply.

The minimum requirements which must be met for public consultation in the preparation of the major amendment include:

- (i) an INFORMATION CENTRE to enable interested external participants to review, and comment on, the proposed amendment and, where applicable, alternatives which were considered; and
- (ii) an opportunity for public inspection of the MNR-approved major amendment.

The specific details of each of these opportunities for public consultation, including requirements for public notices, time periods for responses from interested external participants, and opportunities for interested parties/persons to request a "Bump-up" of the major amendment to Individual Environmental Assessment status (Refer to PART TWO, Section 2.3), are identical to the corresponding opportunities which are provided for the production of a new Timber Management Plan, as described in PART TWO, Section 2.1.3.

The documentation requirements for a major amendment include:

- documentation of the requirement for, and nature of, the amendment; and

- supplementary documentation of public consultation in the preparation of the amendment, and where applicable, the application of the comprehensive planning requirements for:

(i) access roads, and

(ii) operations in specific areas of concern to other Crown land resource users/uses.

The supplementary documentation addresses the same requirements as are necessary for a new Timber Management Plan, as described in PART TWO, Section 2.1.4.2.

The MNR review and approval requirements for a major amendment involve an immediate review upon submission of the proposed amendment and accompanying supplementary documentation by the District, Region and Forest Resources Group, Main Office. If the review is favourable, the amendment will be approved jointly by the Director, Timber Sales Branch and the Regional Director. If the review is unfavourable, the Director, Timber Sales Branch is authorized to refuse the amendment. The decision on refusal or approval of the proposed amendment will normally be forwarded to the District Manager, and for company-prepared plans, the particular company involved, within fifteen (15) days of the submission of the proposed amendment.

Upon approval or refusal of the major amendment by MNR senior management, the Director, Timber Sales Branch will notify the appropriate Regional Office, and the Environmental Assessment Branch, of the Ministry of the Environment. If the major amendment was approved, a summary of the requirement for, and nature of, the MNR-approved amendment must also be submitted for the Ministry of the Environment's public record files.

Assuming that MNR's approval of the major amendment is confirmed following provision of the final opportunity for interested parties/persons to request a "Bump-up", the approved amendment will be appended to the previously-approved Timber Management Plan.

2.2 The Annual Work Schedule

2.2.1 General

An Annual Work Schedule is produced each year to guide the actual implementation of timber management operations. The Annual Work Schedule is prepared for a 12-month period which normally commences on the first day of April of each year, and must be approved by the MNR District Manager before operations can proceed. Responsibility for the preparation of the Annual Work Schedule rests with the MNR Management Unit Forester or, for company-prepared schedules, the Company Forester.

The Annual Work Schedule is not a plan, but is simply a schedule for the implementation of one year of operations. The Annual Work Schedule selects, from the five-year plan of operations of the Timber Management Plan, those timber management operations which will be carried out during a 12-month period. The Annual Work Schedule provides the necessary link between the five-year plan of operations and the government (or company) annual work planning and budget allocation process which makes personnel and financial resources available to carry out the operations.

2.2.2 Contents of the Annual Work Schedule

The Annual Work Schedule describes the operations which will be carried out during the next 12-month period, as previously determined in the five-year plan of operations. The description of operations will include:

- the access roads which will be constructed; and
- the harvest, renewal and tending operations which will be carried out.

In addition, the Annual Work Schedule will describe the protection (i.e. insect/disease pest control) operations, if any, which will be carried out in areas which were selected for protection in the application of the annual planning procedure for protection operations (Refer to APPENDIX III).

MNR's "Timber Management Planning Manual for Crown Lands in Ontario" ¹ outlines the format and content requirements for the Annual Work Schedule. These requirements, as set out in Chapter 5 of the manual, represent the minimum content requirements for an acceptable Annual Work Schedule, whether produced by MNR or an individual forest company.

2.2.3 MNR's Review and Approval Process

A draft Annual Work Schedule must be produced and submitted for MNR review and approval at least two months prior to its 12-month term of application, which normally commences on the first day of April of each year. (For Forest Management Agreement Forests (FMA's), all FMA agreements require that a draft Annual Work Schedule must be submitted by November 30 of the previous year).

Upon submission of the draft Annual Work Schedule, MNR will undertake an internal review by the District over a period of normally thirty (30) days. This review could be favourable, recommending approval of the draft Annual Work Schedule as submitted, or unfavourable, culminating in a list of required alterations, and the reasons for them. The District Manager will forward this list to the District's Timber Supervisor, or for company-prepared schedules, to the particular forest company involved.

If the draft Annual Work Schedule is consistent with the approved Timber Management Plan, and MNR's internal review recommends its approval, the draft schedule will then be approved by the District Manager.

If alterations to the draft Annual Work Schedule are required, a period of normally thirty (30) days is provided for production of the revised Annual Work Schedule which is submitted for MNR review and approval. Upon submission of the revised Annual Work Schedule, MNR will undertake an immediate internal review by the District to ensure that the required alterations have been made. If the required alterations have been satisfactorily incorporated, the revised Annual Work Schedule will be approved by the District Manager, normally within a few days of the submission of the revised schedule.

(NOTE: For the five-year term of the Timber Management Plan, MNR's review and approval process for the first Annual Work Schedule will necessarily overlap with the latter stages of MNR's review and approval process for the Timber Management Plan. Approval of that first Annual Work Schedule cannot be granted by the District Manager until the Timber Management Plan has received final approval.)

2.2.4 Public Inspection

Upon approval of the Annual Work Schedule, the District Manager will issue a public notice advising interested external parties/persons that the approved Annual Work Schedule is available for inspection at the MNR District office.

The public notice will normally be in the form of:

- direct written notices to all parties/persons known to be directly affected by timber management operations during the next 12-month period, and
- general public notices, usually in the form of paid public advertisements in the local media, advising the general public of the opportunity for inspection of the approved Annual Work Schedule.

Direct verbal communication may serve as an alternate form of notification, where appropriate.

The approved Annual Work Schedule will remain available for public inspection at the MNR District office at any time during its 12-month term of application.

(NOTE: As normal MNR procedure, during the 12-month term of the Annual Work Schedule, the District Manager will also issue a public notice at least thirty (30) days prior to the anticipated date of any aerial application of any pesticide on the management unit for timber management purposes. During that period, the approved project descriptions for any site preparation, tending or protection operations

which involve the aerial application of pesticides will be available for public inspection at the MNR District office.

The public notice will normally be in the form of paid public advertisements in the local media, advising all interested and potentially affected parties/persons, and the general public, that the projects will soon be implemented, and offering the opportunity for inspection of the approved project descriptions at the MNR District office.)

2.2.5 Amendments

Amendments to the approved Annual Work Schedule may be made during its 12- month term of application, provided that the amendments are consistent with the five-year plan of operations of the Timber Management Plan. Documentation of the requirement for, and nature of, any proposed amendment must be submitted to the District Manager for approval, and the approved amendment must be appended to the previously-approved Annual Work Schedule. No further public notices will be issued for amendments to the approved Annual Work Schedule. Rather, the annual public notice advising interested external parties/persons that the approved Annual Work Schedule is available for inspection at the MNR District office at any time during its 12- month term of application will also indicate that any future amendments to the approved Annual Work Schedule will be available for inspection.

2.3 "Bump-up" Provisions

In the preparation of a Timber Management Plan, or a major amendment to a previously-approved plan, the proposed timber management operations may cause significant adverse environmental impacts or significant public controversy. For such plans or major amendments, the planning provisions of this Class Environmental Assessment may be unable to satisfactorily resolve the concerns, and special planning requirements may be necessary.

Therefore, within the timber management planning process, a mechanism is provided for elevating a Timber Management Plan, a component part of a

Timber Management Plan (e.g. a primary or secondary access road, or the operational prescription(s) for a specific area of concern), or a major amendment to a previously-approved plan, from the Class Environmental Assessment to Individual Environment Assessment status. The result would be that an Individual Environmental Assessment for a specific plan, a component part of a plan, or a major amendment would have to be prepared and submitted for formal review and approval under The Environmental Assessment Act, including the possibility of a formal public hearing. This act of elevating a plan, a component part of a plan, or a major amendment to Individual Environmental Assessment status is called "Bump-up".

Provision of opportunities for interested parties/persons to request a "Bump-up" is incorporated in the timber management planning process for the Timber Management Plan, any renewal of the plan (whether scheduled or unscheduled), and any major amendment to a previously-approved plan. The "Bump-up" procedure may be initiated at any time during the timber management planning process, with a final opportunity within thirty (30) days of the public notice advising interested participants that the MNR-approved plan or major amendment is available for inspection at the MNR District office.

It is expected, however, that any interested party/person with a concern would bring this concern to MNR's attention early in the timber management planning process when MNR has maximum flexibility to deal with the concern.

The procedure for submission of a "Bump-up" request is as follows:

1. A party (e.g. government ministry or agency, interest group) or person with a concern would bring that concern to MNR's attention.
2. If the concern is not resolved through discussions with MNR, MNR could voluntarily prepare an Individual Environmental Assessment for the particular Timber Management Plan, a component part of the plan, or a major amendment to a previously-approved plan, OR the party/person could request that MNR initiate a "Bump-up".

3. If MNR refuses and the party/person with the concern wishes to pursue the "Bump-up" request, the party/person may request the Minister of the Environment to direct MNR to undertake an Individual Environmental Assessment for that Timber Management Plan, a component part of the plan, or a major amendment to a previously-approved plan. Any such request must be submitted in writing, with accompanying reasons for the request.

If a "Bump-up" request is initiated during the preparation of the Timber Management Plan or major amendment, the production, review and approval of the plan or major amendment may proceed while the Minister of the Environment considers the request.

If a "Bump-up" request is initiated during the thirty (30)-day period for public inspection of the MNR-approved Timber Management Plan or major amendment, operations which are set out in that plan or major amendment cannot proceed until the Minister of the Environment has made a decision on the request.

4. The Minister of the Environment considers the "Bump-up" request, and provides an opportunity for the Minister of Natural Resources to respond to the request before he makes a decision. That decision will normally be made within forty-five (45) days of the submission of the "Bump-up" request.

If the Minister of the Environment does not agree to the "Bump-up" request, he would give notice with reasons to MNR and the party/person requesting the "Bump-up" that the request has been refused. MNR, or the particular forest company involved, would then be free to proceed with the planning and implementation of operations.

If the Minister of the Environment agrees to the "Bump-up" request, the Minister would give notice with reasons to MNR and the party/person requesting the "Bump-up" that the approval of the Class Environmental Assessment does not apply to the specific plan, a component part of the plan, or the major amendment. In all such cases, MNR would be required to prepare and submit an

Individual Environmental Assessment for the Timber Management Plan, a component part of the plan, or the major amendment to a previously-approved plan, for formal review and approval under The Environmental Assessment Act. In the case of company-prepared plans or amendments, the particular forest company involved would provide assistance to MNR.

Opportunities for interested parties/persons to request a "Bump-up" are also specifically incorporated in the annual planning procedure for protection operations, as described in APPENDIX III. The procedure for submission of a "Bump-up" request regarding the proposed use of insecticides/fungicides for annual insect/disease pest control projects is identical to the procedure outlined in the preceding paragraphs.

2.4 Phasing-in Schedule

2.4.1 Timber Management Plans

Production of new Timber Management Plans for all management units in the province is not achieved entirely within a single year, but rather occurs on a five-year cycle. In addition, as previously described in PART TWO, Section 2.1.1, a new Timber Management Plan for each management unit is produced every five years.

Therefore, the timber management planning process described in PART TWO, Section 2.1 will be phased-in to all management units in the province over a period of five years. The application of the planning process in the preparation of a new Timber Management Plan for each management unit will coincide with the expiry date of the current approved "Operating Plan". Assuming immediate application upon submission of this Class Environmental Assessment to the Ministry of the Environment in December, 1985, the planning process will initially apply to those management units for which a new Timber Management Plan must be in place by April 1, 1987.

APPENDIX IV provides a complete listing of all management units in Ontario, categorized by the year in which a new Timber Management Plan must be in

place, and further differentiated by the type of management unit (i.e. Crown or Company Management Unit, or Forest Management Agreement Forest (FMA)).

2.4.2 Contingencies

Uncontrollable circumstances may arise from time to time which cause the schedule for production, review and approval of a Timber Management Plan to be unattainable by the required due date. For example, such situations could occur because of staff being re-directed to deal with forest fire emergencies, or as a result of a successful "Bump-up" request. Also, a major catastrophe such as a forest fire could render an existing approved Timber Management Plan obsolete.

In such situations, contingency plans must be developed to enable operations to proceed, particularly harvest operations of individual forest companies. Otherwise, wood-processing facilities would have to be shut down and large numbers of people would become unemployed. Upon identification of such a situation, the Director, Timber Sales Branch, will notify the Director, Environmental Assessment Branch, Ministry of the Environment. In consultation with the Regional Directors of each Ministry's Regional Offices, a joint decision will be made by the two Ministries on the required contingency plans which must be developed and followed to permit operations to proceed.

2.4.3 Protection Operations

In addition, the annual planning procedure for protection operations, as described in APPENDIX III, will also be phased-in during 1986. Initial application of that planning procedure will apply to insect/disease pest control operations which will be proposed for the spring/summer of 1987. Application of the complete planning requirements for protection operations will not be achieved until the full phase-in of the timber management planning process to all management units.

PART THREE

**IMPLEMENTATION MANUALS
AND MONITORING**

PART THREE: IMPLEMENTATION MANUALS AND MONITORING

1. IMPLEMENTATION MANUALS

1.1. General

Resource managers and planners have a number of manuals available to assist them in the timber management planning process, and to guide the implementation of on-the-ground activities. The implementation manuals provide technical direction or working guidelines to the practising foresters and resource managers. The manuals are written primarily by staff of the Ministry of Natural Resources, but in certain cases other agencies or groups may take a lead role in this task. Some of the manuals are reviewed extensively by external groups before their finalization; those of a very technical nature may receive restricted external review. In all cases, the manuals are periodically revised to reflect new technical knowledge and working experience.

This chapter briefly discusses MNR's implementation manuals. The manuals have been grouped into three categories for explanation purposes.

1.2 Silvicultural Guides

This set of manuals provides direct technical assistance to the forester when selecting management prescriptions for individual forest stands during timber management planning. MNR has produced silvicultural guides for a number of "working groups", or forest stands having the same predominant species. These guides describe the characteristics of the particular tree species and outline the management prescriptions that could be applied. The documents are written on the basis of field experience in the management of the working group, and available research results on silvicultural treatments for the working group.

The following silvicultural guides have been produced and adopted by MNR, and have been in use for some time:

- "A Silvicultural Guide to the White Pine Working Group"6;
- "A Silvicultural Guide to the Black Spruce Working Group"7;

- "A Silvicultural Guide to the Hard Maple, Yellow Birch and Hemlock Working Group in Ontario"⁸; and
- "A Silvicultural Guide to the Aspen Working Group in Ontario"⁹.

In December, 1985, MNR completed a fifth such guide:

- "A Silvicultural Guide to the Jack Pine Working Group in Ontario"¹⁰.

1.3 Manuals for Consideration of Other Resources in Timber Management

In recent years, the Ministry of Natural Resources has been placing an increased emphasis on its policy of "integrated resource management." This has led to the preparation of manuals which provide direction to resource managers in how to deal with specific resource interests when those interests might be affected by timber management operations. The guidelines can be applied both in the planning stage and during implementation of timber management operations. These guidelines identify a range of possible techniques or methods by which the impacts of timber management operations may be prevented, minimized or mitigated.

At present, there are three manuals in use, addressing the subjects of Fisheries, Moose, and Tourism. The Fisheries and Moose manuals have been produced by MNR and have undergone review within the Ministry and by selected outside groups. The Tourism manual was developed through the joint efforts of the tourism and forest products industries, under the general auspices of the Ministry of Natural Resources and the Ministry of Tourism and Recreation. The tourism manual has also undergone MNR and (selected) external review.

The Ministry recognizes that it must continually assess the need for new manuals, or for revisions to existing manuals. The manuals which deal with other resource values must incorporate the most current approach to dealing with other resources in timber management planning. The most current approach, which is reflected in the Class Environmental Assessment, is being applied as existing manuals are reviewed, or new manuals are written.

1.4 Other Manuals

The Ministry has developed other manuals which are applied in the planning and implementation of timber management operations. Two manuals which are particularly useful in the consideration of measures to prevent, minimize or mitigate environmental impacts associated with timber management operations are:

- "Resource Access Roads Policy and Implementation Strategies and Guidelines"⁵; and
- "Construction and Mitigation Handbook for MNR Class EA Projects"¹¹.

The first manual amalgamates current Ministry policies and procedures dealing with access roads, and provides helpful direction when applying the planning process described in Appendix II of this Class Environmental Assessment. The second manual was developed in association with other MNR Class Environmental Assessments. Sections of this handbook address general construction activities, access roads, shoreline and streambank stabilization and gravel pits. The handbook identifies possible means to prevent, minimize or mitigate environmental impacts and may be useful as a guide in the implementation of certain timber management operations such as road construction.

The Ministry maintains other technical manuals, which are used to guide staff in carrying out specific timber management operations. Two such manuals are:

- "Aerial Spraying for Forest Management – An Operational Manual"¹², and
- "Prescribed Burning Manual"¹³.

2. MONITORING AND ASSESSMENT

A system of monitoring compliance with Timber Management Plans and assessment of performance has been in place for some time. An annual record-keeping system, which requires submission of annual reports of operations which have been carried out during the past year, contributes to a "report on past operations" which must be included in every Timber Management Plan. That report, which summarizes operations for the previous five-year period, presents a quantitative comparison of planned versus actual operations. Analysis of that quantitative information contributes to a regular assessment of achievements, and if required, re-direction of management efforts in the next Timber Management Plan, to ensure that the long-term objectives of timber management for the management unit are realized.

The "Timber Management Planning Manual for Crown Lands in Ontario"¹ provides specific direction for annual report requirements in Chapter 6, and the "report on past operations" component of a Timber Management Plan in Chapter 4, Section 4.6.

For Forest Management Agreement Forests (FMA's), regular five-year reviews of achievements and obligations must be undertaken before the agreements can be extended for an additional five years. Those reviews are formally tabled in the Legislature.

Also, a number of special audits take place from time to time. For example, the Provincial Auditor undertook an audit of MNR's Forest Resources Program in 1984-1985. The results of this audit were tabled in the Legislature on November 1, 1985. As well, a special audit on the present and expected future state of Ontario's forests is currently being undertaken by G. Baskerville, Dean of Forestry, University of New Brunswick. The Terms of Reference for Dean Baskerville's Audit are contained in APPENDIX VII.

Qualitative monitoring requirements have also been in place for some time. The Ministry's operational audits of its Forest Resources Program at both the Regional and District levels periodically address the qualitative aspects of program achievements within individual Districts and Regions, and across the

province. Additional qualitative monitoring of operations themselves is undertaken at the District level in the form of cut inspections, work permit inspections, and contract administration.

Upon approval of this Class EA, a program of environmental monitoring will also be instituted at the District level, involving the same multi-disciplinary planning team which is responsible for the preparation of the Timber Management Plan. The program will involve a sampling system which focuses on assessment of environmental effects and the effectiveness of operations in specific areas of concern to other users, or types of associated areas of concern, within the District. The results of the program will be incorporated in future timber management planning through improved predictive capabilities regarding effects, improved access road planning and more effective operational prescriptions. The assessment of the effectiveness of operations will also feed back into regular reviews and, if required, revisions of the implementation manuals referred to in PART THREE, Chapter 1.

REFERENCES

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4. MNR, 1978. "Forest Inventory Procedure for Ontario."
5. MNR, 1985. "Resource Access Roads Policy and Implementation Strategies and Guidelines".
6. MNR, 1973. "A Silvicultural Guide to the White Pine Working Group"
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10. MNR, 1985. "A Silvicultural Guide to the Jack Pine Working Group in Ontario".
11. MNR, 1982. "Construction and Mitigation Handbook for MNR Class EA Projects".
12. MNR, 1981. "Aerial Spraying for Forest Management - An Operational Manual".
13. MNR, 1984. "Prescribed Burning Manual".

APPENDIX I

APPENDIX I

PLANNING PROCEDURE FOR MODIFIED OPERATIONS IN AREAS OF CONCERN

As described in PART TWO, Chapter 2, Section 2.1, in the planning of operations within specific areas of concern to other Crown land resource users/uses, if it is determined that modifications to normal operations are required to protect the other identified resource values, a comprehensive planning procedure must be followed. That planning procedure may be applied to an individual area of concern, or to a type of associated areas of concern, such as shorelands of lake trout lakes and deer yards.

The planning procedure requires consideration of alternatives for harvest, renewal and/or tending operations. A comprehensive evaluation and comparison of the potential environmental effects of the alternative modified practices is required, with the results of that analysis providing the basis, and supporting rationale, for the selection of the preferred/most acceptable modified management prescription.

The following discussion provides a detailed description of the comprehensive planning procedure, which involves three steps:

- (i) the consideration/identification of alternatives;
- (ii) the environmental analysis of the alternatives; and
- (iii) the selection of the preferred/most acceptable alternative, with supporting rationale.

STEP ONE: Consideration/Identification of Alternatives

For each specific area of concern, or type of associated areas of concern, alternatives for harvest, renewal and/or tending operations, as required, must be considered. In this planning procedure, those activities will normally be treated as a package, with alternative packages of modified operations serving as the

alternative modified management prescriptions which are considered in the subsequent steps of the procedure.

In some cases, only one modified management prescription may be considered to be suitable. In such situations, an environmental analysis of the proposed modified management prescription must still be produced, in accordance with the requirements of STEP TWO of this planning procedure. The supporting rationale for the selected modified management prescription, as required in STEP THREE of this planning procedure, will provide a comprehensive justification of the decision that no other suitable alternative modified management prescriptions could be identified.

Normally, however, alternative modified management prescriptions will be identified for each specific area of concern, or type of associated areas of concern. The number of alternatives which are identified for individual areas of concern may vary considerably, depending on the physical and biological conditions encountered, and the identified resource values which require protection.

As discussed in PART THREE, Chapter 1, MNR has produced a number of guidelines for timber management operations in various types of areas of concern (e.g. fisheries habitat, moose habitat and areas of tourism value). These guidelines provide information on alternative modified operations which could be employed to protect particular resource values. In addition, MNR's Silvicultural Guides (Refer to PART THREE, Chapter 1) serve as additional sources of information for the determination of alternative modified management prescriptions.

STEP TWO: Environmental Analysis of the Alternatives

The potential environmental implications of each alternative modified management prescription must be determined in order that a selection of the preferred/most acceptable alternative may be made. For each alternative, this environmental analysis involves:

- (i) identification of the potential environmental effects;
- (ii) determination of the significance of those effects; and
- (iii) identification of potential preventive and mitigative measures.

(i) Identification of the potential environmental effects

A description of the types and variety of potential environmental effects which may be incurred by the alternative methods of carrying out harvest, renewal and tending operations is presented in PART ONE, Chapter 11, Section 11.3. The identification of the potential environmental effects of the alternative modified management prescriptions in an individual area of concern, or type of associated areas of concern, will concentrate on those potential effects which are particular to the physical and biological conditions encountered, and the potential effects on the identified resource values which require protection.

Members of the MNR multi-disciplinary planning team will contribute to the identification of the potential environmental effects of each alternative modified management prescription. Comments and submissions from interested external participants during public consultation in the preparation of the Timber Management Plan (Refer to PART TWO, Chapter 2, Section 2.1.3) will serve as additional sources of information on potential effects.

(ii) Determination of the significance of those effects

The estimation of the significance of the predicted effects (i.e. the translation of effects into impacts by incorporating value judgements) of each alternative modified management prescription is based on information which may be both qualitative (e.g. the perceived value and sensitivity of the features or resource values affected) and quantitative (e.g. the number and areal extent of the features affected).

The significant impacts of each alternative modified management prescription are identified on the basis of the professional knowledge and experience of members of the MNR multi-disciplinary planning team, and consideration of comments and submissions from interested external participants regarding the significance of the predicted effects of each alternative.

(iii) Identification of potential preventive and mitigative measures

The alternative modified management prescriptions which are identified for individual areas of concern, or types of associated areas of concern, in **STEP ONE** of this planning procedure inherently address modified practices which could be used to prevent, minimize or mitigate the potential adverse environmental effects of timber management operations on particular resource values. However, in certain specific areas of concern in which several resource values which require protection have been identified, it may not be possible to identify alternative modified management prescriptions which protect all of those resource values adequately. In such situations, additional measures which could be used to prevent, minimize or mitigate the potential adverse environmental effects of timber management operations, and for which firm commitments can be made, must be identified for each alternative modified management prescription. Such measures could be the key determining factors in the ultimate selection of the preferred/most acceptable alternative.

The net impacts of each alternative modified management prescription are determined by qualifying the initial identification of significant impacts (i.e. the product of (i) and (ii)) with the benefits of the potential preventive and mitigative measures for which firm commitments can be made (i.e. the product (iii)). The result is an evaluation of the potential environmental implications of each alternative, in the form of an inventory or listing of net impacts.

**STEP THREE: Selection of the Preferred/Most Acceptable Alternative, with
Supporting Rationale**

A comparative summary of the potential environmental implications of the alternative modified management prescriptions is produced from the individual evaluations of each alternative, and provides the basis for the selection of the preferred/most acceptable alternative. The selection of the preferred/most acceptable modified management prescription is invariably based upon judgement. Although it may be fairly simple to select an alternative with respect to any single potential impact, ultimately all potential impacts must be assessed jointly. Comments and submissions from interested external participants regarding each of the alternatives will be particularly helpful with such decisions.

The selection of the preferred/most acceptable modified management prescription for each specific area of concern, or type of associated areas of concern, is recorded in the supplementary documentation which must accompany the Timber Management Plan. That supplementary documentation will describe how the planning procedure was applied, and the supporting rationale for the selection. That supporting rationale will explain the trade-offs which were required, and the consideration of comments and submissions from interested external participants in those trade-offs. Where applicable, the preventive and mitigative measures for which firm commitments can be made will also be described.

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Appendix II

APPENDIX II

PLANNING PROCEDURE FOR ACCESS ROADS IN AREAS OF CONCERN

As described in PART TWO, Chapter 2, Section 2.1, in the planning of operations within specific areas of concern to other Crown land resource users/uses, if a primary or secondary access road must traverse a specific area of concern, a comprehensive planning procedure must be followed.

The planning procedure requires consideration of alternative precise road locations (i.e. maximum 100 m width) for each required road within each specific area of concern. A comprehensive evaluation and comparison of the potential environmental effects of the alternative road locations is required, with the results of that analysis providing the basis, and supporting rationale, for the selection of the preferred/most acceptable road location.

The following discussion provides a detailed description of the comprehensive planning procedure, which involves three steps:

- (i) the consideration/identification of alternatives;
- (ii) the environmental analysis of the alternatives; and
- (iii) the selection of the preferred/most acceptable alternative, with supporting rationale.

STEP ONE: Consideration/Identification of Alternatives

For each required primary and secondary road within each specific area of concern, alternative precise road locations (i.e. maximum 100 m width) must be considered. In some cases, only one road location may be considered to be suitable. In such situations, an environmental analysis of the proposed road location must still be produced, in accordance with the requirements of STEP TWO of this planning procedure. The supporting rationale for the selected road location, as required in STEP THREE of this planning procedure, will provide a

comprehensive justification of the decision that no other suitable alternative road locations could be identified.

Normally, however, alternative precise road locations will be identified for each required primary and secondary access road within each specific area of concern. The number of alternatives which are identified in individual areas of concern may vary considerably, depending on the extent and configuration of the existing access system, the physical and biological conditions encountered, and the identified resource values which require protection.

The alternative precise road locations will be identified to a maximum width of 100 m, although some aspects of their location (e.g. stream crossings) may be more specifically defined. Segments of those precise road locations may also be common to some, or all, of the alternatives.

STEP TWO: Environmental Analysis of the Alternatives

The potential environmental implications of each alternative precise road location must be determined in order that a selection of the preferred/most acceptable alternative may be made. For each alternative, this environmental analysis involves:

- (i) identification of the potential environmental effects;
- (ii) determination of the significance of those effects; and
- (iii) identification of potential preventive and mitigative measures.

(i) Identification of the potential environmental effects

A description of the types and variety of potential environmental effects which may be incurred by access roads is presented in PART ONE, Chapter 11, Section 11.2.2. The identification of the potential environmental effects of the alternative road locations in a specific area of concern will concentrate on those potential effects which are particular to the physical and biological conditions encountered, and the potential effects on the

identified resource values which require protection.

Members of the MNR multi-disciplinary planning team will contribute to the identification of the potential environmental effects of each alternative road location. Comments and submissions from interested external participants during public consultation in the preparation of the Timber Management Plan (Refer to PART TWO, Chapter 2, Section 2.1.3) will serve as additional sources of information on potential effects.

(ii) Determination of the significance of those effects

The estimation of the significance of the predicted effects (i.e. the translation of effects into impacts by incorporating value judgements) of each alternative road location is based on information which may be both qualitative (e.g. the perceived value and sensitivity of the features or resource values affected) and quantitative (e.g. the number and areal extent of the features affected).

The significant impacts of each alternative road location are identified on the basis of the professional knowledge and experience of members of the MNR multi-disciplinary planning team, and consideration of comments and submissions from interested external participants regarding the significance of the predicted effects of each alternative.

(iii) Identification of potential preventive and mitigative measures

There may be measures, over and above the normal operations employed in the construction of access roads, which could be used to prevent, minimize or mitigate the potential adverse environmental effects of each alternative road location. MNR's "Construction and Mitigation Handbook for MNR Class EA Projects"¹¹ (Refer to PART THREE, Chapter 1) serves as the principal source for the identification of potential preventive and mitigative measures for access road construction.

In addition, consideration of "use management strategies" for each alternative road location, as is ultimately required for each primary and

secondary road proposed in a Timber Management Plan, may serve as a principal determinant of potential preventive and mitigative measures. MNR's "Resource Access Roads Policy and Implementation Strategies and Guidelines"⁵ provide a comprehensive description of potential use management strategies which could be employed.

Potential preventive and mitigative measures for which firm commitments can be made must be identified for each alternative road location. Such measures could be the key determining factors in the ultimate selection of the preferred/most acceptable alternative.

The net impacts of each alternative precise road location are determined by qualifying the initial identification of significant impacts (i.e. the product of (i) and (ii)) with the benefits of the potential preventive and mitigative measures for which firm commitments can be made (i.e. the product (iii)). The result is an evaluation of the potential environmental implications of each alternative, in the form of an inventory or listing of net impacts.

STEP THREE: Selection of the Preferred/Most Acceptable Alternative, with Supporting Rationale

A comparative summary of the potential environmental implications of the alternative precise road locations is produced from the individual evaluations of each alternative, and provides the basis for the selection of the preferred/most acceptable alternative. The selection of the preferred/most acceptable road location is invariably based upon judgement. Although it may be fairly simple to select an alternative with respect to any single potential impact, ultimately all potential impacts must be assessed jointly. Comments and submissions from interested external participants regarding each of the alternatives will be particularly helpful with such decisions.

The selection of the preferred/most acceptable location for each required primary and secondary access road within each area of concern is recorded in the supplementary documentation which must accompany the Timber Management Plan. That supplementary documentation will describe how the planning procedure was applied, and the supporting rationale for the selection. That

supporting rationale will explain the trade-offs which were required, and the consideration of comments and submissions from interested external participants in those trade-offs. Where applicable, the preventive and mitigative measures for which firm commitments can be made will also be described.

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Appendix III

APPENDIX III

ANNUAL PLANNING PROCEDURE FOR PROTECTION OPERATIONS

INTRODUCTION

In timber management, maintenance operations include measures which are carried out to protect the growing or mature forest from insect and disease infestations. These protection operations are commonly referred to as the activity of insect/disease pest control.

The focus of insect/disease pest control operations in timber management is not normally suppression of the insect/disease populations, but rather protection of the growing or mature forest from the debilitating effects of insect/disease infestations. In some situations, suppression or containment of insect populations may be undertaken.

As discussed in PART TWO, Chapter 2, Section 2.1, in the preparation of the Timber Management Plan it is not possible to specifically identify the areas of a management unit on which protection operations will be carried out, because of the unpredictable nature of insect and disease infestations. Rather, in the five-year plan of operations, the areas of a management unit on which protection operations may be carried out, if required, during the next five-year term are identified.

The occurrence and extent of insect and disease infestations are determined annually through regular surveys conducted by the Canadian Forestry Service, an agency within the federal Department of Agriculture. Consequently, annual planning requirements are necessary to identify the specific areas within a management unit which require protection, and to determine the insect/disease pest control operations which will be carried out.

While equally applicable to protection operations for disease infestations, the predominant focus of the annual planning procedure is large-scale insect infestations, such as spruce budworm, oak leaf shredder, jack pine budworm, Gypsy moth and forest tent caterpillar. Control of insect infestations normally requires consideration of the application of insecticides, involving various chemical and

biological agents, to protect the current year's foilage, to suppress insect infestation epicentres, and to contain outbreaks.

The following discussion outlines the details of the annual planning procedure for aerial protection operations, including provisions for public consultation. The planning procedure is applied at the MNR District level, and therefore addresses protection operations for all management units within the District as a single package.

DISTRICT AND REGIONAL COMMITTEES

Upon receipt of the results of the annual insect/disease surveys conducted by the Canadian Forestry Service (normally in August of each year), the District Manager establishes a District working committee which is responsible for the application of this annual planning procedure. This committee normally includes the same staff members as the MNR multi-disciplinary planning team involved in the preparation of the Timber Management Plans for management units in the District. In addition, a representative from the Canadian Forestry Service and representatives from MNR's Pest Control Section, Forest Resources Group, Main Office and the major forest companies operating in the District are also included. If several Districts within a Region are involved, the Regional Director may also establish a regional co-ordinating committee, with responsibility for overseeing the consistent application of the procedure and co-ordination of the results across all Districts within the Region.

SELECTION OF AREAS FOR PROTECTION OPERATIONS

As described in PART TWO, Chapter 2, Section 2.1, in the Timber Management Plan for each management unit within the District, areas have been identified as eligible for protection operations, if required, during the next five-year term. The annual insect/disease surveys conducted by the Canadian Forestry Service establish the occurrence and extent of insect/disease infestations during a particular year. The combination of the identification of areas eligible for protection operations and the results of the annual insect/disease surveys enables the selection of areas which require protection to control insect/disease infestations during the following year, normally in late spring/early summer.

On the basis of this information, the District working committee makes a recommendation to the Regional Director (normally in September of each year) concerning the need for protection operations, and requests permission to proceed with planning.

CONSIDERATION AND ANALYSIS OF OPTIONS FOR PROTECTION OPERATIONS

Upon endorsement by the Regional Director of the need for protection operations, the District working committee proceeds with the consideration and analysis of optional treatments for the control of insect/disease infestations in the areas selected for protection during the next spring/summer, and the selection of a recommended course of action.

The following options would normally be considered, individually or in combination:

- (i) no treatment;
- (ii) accelerated harvest operations in the areas of the infestation;
- (iii) re-direction of harvest operations from non-infested areas to the areas of the infestation;
- (iv) salvage operations (to prevent other insect/disease infestations and to utilize the damaged timber before it degenerates); and
- (v) use of insecticides/fungicides (chemical and /or biological).

The analysis of the options, which provides the basis, and supporting rationale, for the selection of a recommended course of action, involves an evaluation and comparison of:

- (i) their relative effectiveness in protecting the forest and controlling the insect/disease infestations;

- (ii) estimated economic costs and benefits;
- (iii) concerns of other Crown land resource users/uses; and
- (iv) potential environmental impacts, and measures to prevent, minimize or mitigate those impacts.

The District working committee's consideration and analysis of options, and selection of a recommended course of action, must be documented and submitted for review by the Regional Director. If the Regional Director has also established a regional co-ordinating committee, that committee initially amalgamates the recommendations from all Districts in the Region. The Regional Director then reviews those recommendations and makes a decision on a co-ordinated regional recommendation for review by senior management at MNR's Main Office.

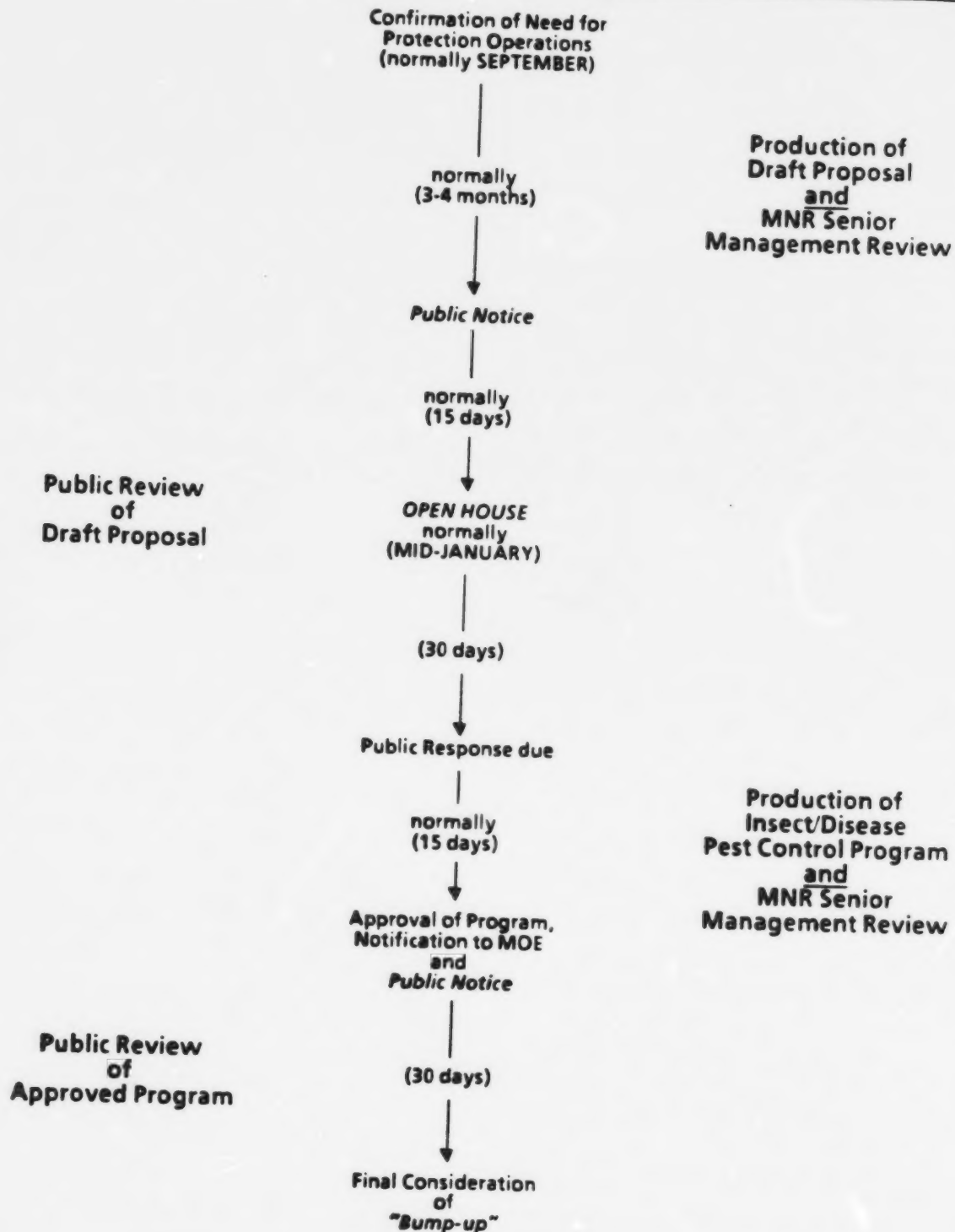
If the recommended course of action involves the use of insecticides/fungicides, a draft proposal for specific insect/disease pest control projects must also be produced for review at this stage of the annual planning procedure. If the recommended course of action involves accelerated harvest operations, re-directed harvest operations or salvage operations, no further planning is required at this stage of the annual planning procedure. Rather, an amendment to the Timber Management Plan for the appropriate management units in the District is required. In either case, review and endorsement of the recommended course of action by the Regional Director and senior management at MNR's Main Office is required prior to proceeding with planning.

The planning procedure for amendments to Timber Management Plans (Refer to PART TWO, Chapter 2, Section 2.1.5) applies if the recommended course of action involves accelerated harvest operations, re-directed harvest operations or salvage operations.

The remainder of this annual planning procedure applies only if the recommended course of action involves the use of insecticides/fungicides for insect/disease pest control. FIGURE III - I outlines the schedule for the production, review and approval of a District insect/disease pest control program which involves the use of insecticides/fungicides. That schedule is designed to ensure that an approved

Figure III-1
Schedule: Insect/Disease Pest Control Program
Production, Review and Approval

Public Consultation Phase	Schedule	Steps in Program Production, Review and Approval
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program is in place by the first day of April of the year in which insect/disease pest control operations must be carried out.

Two formal opportunities for public consultation are provided:

- (i) an opportunity to REVIEW a draft proposal at an OPEN HOUSE, prior to a final decision on the program; and
- (ii) an opportunity for INSPECTION of the approved program.

In addition, as previously discussed in PART TWO, Chapter 2, Section 2.3, opportunities for interested parties/persons to request a "Bump-up" of the District insect/disease pest control program are provided. The "Bump-up" procedure may be initiated at any time during the planning of the annual insect/disease pest control program, with a final opportunity within thirty (30) days of the public notice advising interested participants that the MNR-approved program is available for inspection at the MNR District office. The procedure for submission of a "Bump-up" request is identical to the procedure outlined for a Timber Management Plan in PART TWO, Chapter 2, Section 2.3.

A description of each of the formal opportunities for public consultation is provided in the following discussion of the schedule for the production, review and approval of a District insect/disease pest control program.

PUBLIC REVIEW - OPEN HOUSE

After confirmation of the need for the use of insecticides/fungicides and review of the draft proposal for specific insect/disease pest control projects by MNR's senior management, an opportunity is provided for public REVIEW of MNR's proposed insect/disease pest control program for the District. The District Manager will issue a public notice, normally fifteen (15) days in advance, inviting all interested participants to an OPEN HOUSE (normally in mid-January) to review, and comment on, the draft proposal. At the same time, the District Manager will notify the Pesticides Control Officer of the appropriate Regional Office of the Ministry of the Environment.

The public notice will normally be in the form of:

- direct written invitations to all previously identified participants in the preparation of the Timber Management Plans for individual management units in the District, and those parties/persons known to be directly affected by insect/disease pest control operations which MNR proposes to carry out in the District in the late spring/early summer; and
- general public notices, usually in the form of paid public advertisements in the local media, advising the general public of the opportunity to REVIEW the draft proposal at the OPEN HOUSE.

Direct verbal communication may serve as alternate form of notification, where appropriate.

The public notice will include a map of the District which identifies areas in which MNR proposes to use insecticides/fungicides for insect/disease pest control purposes.

The public notice will inform interested participants that the OPEN HOUSE provides an opportunity to review, and comment on, MNR's proposed insect/disease pest control program for the District, and the draft proposal for specific insect/disease pest control projects, before decisions are made. At the OPEN HOUSE, MNR staff will be present to explain the proposed insect/disease pest control program and the supporting analysis of options, and to respond to any inquiries.

Although a broad array of information will be provided at the OPEN HOUSE in the form of maps, displays and written material, the following information must be available, and is expected to be the principal focus of attention:

- maps which identify areas of the District in which MNR proposes to use insecticides/fungicides for insect/disease pest control purposes;
- the analysis of optional treatments for the control of the insect/disease infestations; and
- the draft proposal for specific insect/disease pest control projects.

The minimum requirement for the OPEN HOUSE is a one-day opportunity at a convenient location. A period of thirty (30) days after the date of the OPEN HOUSE is provided for interested participants to present submissions to the District Manager regarding concerns with MNR's proposed insect/disease pest control program. After the thirty (30)-day review period, MNR will consider the submissions and make a final decision on an insect/disease pest control program for the District

FINALIZATION AND REVIEW OF DISTRICT PROGRAM

In the finalization of the District insect/disease pest control program, the District working committee initially reviews and summarizes the submissions received during public consultation and forwards the summary to the Regional Director. If the Regional Director has also established a regional co-ordinating committee, that committee initially amalgamates the summaries of public submissions from all Districts in the Region.

The Regional Director then directs the District working committee to prepare final project descriptions for the specific insect/disease pest control projects which will be carried out in the District, taking into consideration the public submissions which have been received. The Regional Director's decision on an insect/disease pest control program for each District, and the final project descriptions for specific insect/disease pest control projects, are then submitted for final review and approval by MNR's senior management at Main Office.

The finalization and senior management review of the District insect/disease pest control program will normally be completed within fifteen (15) days.

NOTIFICATION TO MINISTRY OF THE ENVIRONMENT

Upon approval of the District insect/disease pest control program and final project descriptions by MNR's senior management, the District Manager will formally notify the Pesticides Control Officer of the appropriate Regional Office of the Ministry of the Environment. The formal notification will include:

- documentation of MNR's recommended insect/disease pest control program for the District, and the supporting analysis of options;

- a copy of the summary of public submissions on the proposed insect/disease pest control program; and
- a copy of the final project descriptions for specific insect/disease pest control projects.

The District Manager will also notify the Environmental Assessment Branch of the Ministry of the Environment of the MNR-approved insect/disease pest control program for the District, clearly indicating that all documentation requirements have been submitted to the appropriate Regional Office of that Ministry.

PUBLIC INSPECTION OF APPROVED PROGRAM

At the same time as the Ministry of the Environment is notified, the District Manager will issue a public notice advising all interested participants that the MNR-approved project descriptions for specific insect/disease pest control projects are available for inspection at the MNR District office.

The public notice will normally be in the form of:

- direct written notices to all previously identified participants, and all parties/persons known to be directly affected by insect/disease pest control operations which MNR will carry out in the District in the late spring/early summer; and
- general public notices, usually in the form of paid public advertisements in the local media, advising the general public of the opportunity for inspection of the final MNR-approved project descriptions for specific insect/disease pest control projects in the District.

Direct verbal communication may serve as an alternate form of notification, where appropriate.

The public notice will clearly indicate that the opportunity for inspection of the MNR-approved project descriptions provides a final opportunity for interested

participants to request a "Bump-up" of the District insect/disease pest control program, or any specific project in the program, to Individual Environmental Assessment (EA) status (Refer to PART TWO, Chapter 2, Section 2.3). A thirty (30)-day period after the date of the public notice is provided for interested participants to pursue such a request. If a request is not received during that period, the MNR-approved project descriptions for specific insect/disease pest control projects automatically receive final approval.

Upon expiry of the thirty (30)-day period for "Bump-up" requests, the Pesticides Control Officer of the appropriate Regional Office of the Ministry of the Environment will proceed with the formal review and approval of the final project descriptions for specific insect/disease pest control projects in the District, as required under The Ontario Pesticides Act.

The final approved project descriptions for specific insect/disease pest control projects will be formally appended to the Annual Work Schedule for the appropriate management units in the District, as part of the description of operations which will be carried out during the next twelve-month period. As described in PART TWO, Chapter 2, Section 2.2.4, the Annual Work Schedule will remain available for inspection at the MNR District office at any time during its twelve-month term of application.

PUBLIC NOTICE PRIOR TO OPERATIONS

As regular MNR procedure, the District Manager will normally issue a public notice at least thirty (30) days prior to the anticipated date of the aerial application of any insecticide/fungicide for insect/disease pest control purposes. During that period, the approved project descriptions for specific insect/disease pest control projects will be available for public inspection at the MNR District office.

The public notice will normally be in the form of paid public advertisements in the local media, advising all interested and potentially affected parties/persons, and the general public, that the projects will soon be implemented, and offering the opportunity for inspection of the approved project descriptions for specific insect/disease pest control projects at the MNR District office.

LOCAL INFESTATIONS AND CONTINGENCIES

Localized insect/disease infestations may be discovered at any time. If it is determined that such infestations can be treated most appropriately by ground application of insecticides/fungicides, no further detailed planning will be undertaken. All such ground applications will involve the use of only registered materials, and will be undertaken by personnel licensed by the Ministry of the Environment under The Ontario Pesticides Act.

If such localized infestations were not previously identified, and the preferred means of treatment involves the aerial application of insecticides/fungicides, the MNR Regional Director will notify the appropriate Regional Office, and the Environmental Assessment Branch, of the Ministry of the Environment. All necessary approvals for those operations under The Ontario Pesticides Act will be obtained before operations commence.

Appendix IV

APPENDIX IV

PHASING-IN SCHEDULE: TIMBER MANAGEMENT PLANS

This appendix provides a complete listing of all management units in Ontario, categorized by the year in which a new Timber Management Plan must be in place. The listing commences with those management units for which a new Timber Management Plan must be in place by April 1, 1987. Complete phase-in of the timber management planning process described in PART TWO, Chapter 2, Section 2.1 in the preparation of Timber Management Plans for all management units in the province will be realized by April 1, 1991.

(NOTE: The listing reflects the status of management units in the province as of December 31, 1985, and is subject to change.)

1987CROWN MANAGEMENT UNITS

<u>REGION</u>	<u>DISTRICT</u>	<u>MANAGEMENT UNIT</u>
Northwestern	Dryden	Dryden
	Fort Frances	Rainy Lake
		Rainy River
	Kenora	Aulneau
		Minaki
	Red Lake	Red Lake
	Sioux Lookout	Sioux Lookout

COMPANY MANAGEMENT UNITS

<u>REGION</u>	<u>DISTRICT</u>	<u>MANAGEMENT UNIT (& COMPANY)</u>
Northwestern	Sioux Lookout	Lac Seul*
		(MacKenzie Forest Products)
North Central	Terrace Bay	Big Pic
		(James River-Marathon Ltd.)
	Thunder Bay	Black Sturgeon*
		(Great Lakes Forest Products Ltd.)

* Scheduled to become an FMA

FMA'S

<u>REGION</u>	<u>DISTRICT</u>	<u>MANAGEMENT UNIT (& COMPANY)</u>
Northwestern	Fort Frances	Manitou Forest
		(Boise-Cascade Canada Ltd.)
		Seine River Forest
Northern	Chapleau	(Boise-Cascade Canada Ltd.)
		Pineland Forest
		(E.B. Eddy Forest Products Ltd.)

Hearst

Hearst Forest**
(Hearst Forest Management Inc.)
Nagagami Forest
(Quebec North Shore -
Ontario Paper Company)
R. Malette Forest
(Malette Lumber Inc.)

Timmins

** Scheduled to become an FMA in 1986

1988CROWN MANAGEMENT UNITS

<u>REGION</u>	<u>DISTRICT</u>	<u>MANAGEMENT UNIT</u>
Northern	Chapleau	Chapleau
	Cochrane	Cochrane
		Moose River
Eastern	Kirkland Lake	Englehart
	Carlton Place	Lanark

COMPANY MANAGEMENT UNITS

<u>REGION</u>	<u>DISTRICT</u>	<u>MANAGEMENT UNIT (& COMPANY)</u>
North Central	Nipigon	Kiashke (Kiashke Native Development Incorporated)
Northern	Kirkland Lake	Iroquois Falls South (Abitibi-Price Inc.)

FMA'S

<u>REGION</u>	<u>DISTRICT</u>	<u>MANAGEMENT UNIT (& COMPANY)</u>
Northern	Chapleau	Chapleau Forest*** (Northern Forestry Ltd.)
	Cochrane	Cochrane Forest (Quebec North Shore - Ontario Paper Company) Gardiner Forest (Quebec North Shore - Ontario Paper Company)

Timmins

Timmins Forest
(Quebec North Shore -
Ontario Paper Company)
White River Forest
(Domtar Forest Products)

Northeastern

Wawa

*** Scheduled to become an FMA in 1987

1989CROWN MANAGEMENT UNITS

<u>REGION</u>	<u>DISTRICT</u>	<u>MANAGEMENT UNIT</u>
Northern	Kapuskasing	Kapuskasing
	Kirkland Lake	Elk Lake
		Timiskaming
		Watabeag

COMPANY MANAGEMENT UNITS

<u>REGION</u>	<u>DISTRICT</u>	<u>MANAGEMENT UNIT (& COMPANY)</u>
Northwestern	Sioux Lookout	Reba (Abitibi-Price Inc.)

FMA'S

<u>REGION</u>	<u>DISTRICT</u>	<u>MANAGEMENT UNIT (& COMPANY)</u>
Northwestern	Dryden	East Patricia Forest (Boise-Cascade Canada Ltd.)
	Kenora	Lake of the Woods Forest (Boise-Cascade Canada Ltd.)
	Red Lake	Pakwash Forest (Boise-Cascade Canada Ltd.)
	Sioux Lookout	Trout Lake Forest (Great Lakes Forest Products Ltd.)
Northeastern	Wawa	Magpie Forest (Dubreuil Brothers Ltd.)

COMPANY MANAGEMENT UNITS

<u>REGION</u>	<u>DISTRICT</u>	<u>MANAGEMENT UNIT (& COMPANY)</u>
Northwestern	Sioux Lookout	Abitibi Sioux Lookout (Abitibi-Price Inc.) Caribou East (Great Lakes Forest Products Ltd.) Caribou West (Great Lakes Forest Products Ltd.)
North Central	Nipigon	Domtar-Armstrong (Domtar Forest Products)
Algonquin	Algonquin Park	Algonquin Park (Algonquin Forestry Authority)

FMA'S

<u>REGION</u>	<u>DISTRICT</u>	<u>MANAGEMENT UNIT (& COMPANY)</u>
Northwestern	Ignace	English River Forest (Great Lakes Forest Products Ltd.)
North Central	Geraldton	Longlac Forest (Kimberly-Clark of Canada Ltd.) Nakina Forest (Kimberly-Clark of Canada Ltd.)
	Thunder Bay	Brightsands Forest (Great Lakes Forest Products Ltd.) Mattawin-Dog River Forest (Great Lakes Forest Products Ltd.)
Northern	Cochrane	Iroquois Falls Forest (Abitibi-Price Inc.)
	Gogama	Upper Spanish Forest (E.B. Eddy Forest Products Ltd.)

1990**CROWN MANAGEMENT UNITS**

<u>REGION</u>	<u>DISTRICT</u>	<u>MANAGEMENT UNIT</u>
North Central	Atikokan	Flanders
Northeastern	Blind River	Sapawe
		Blind River
		Kirkwood
		Peshu Lake
		Manitoulin
	North Bay	Spanish River
		Mattawa
		Tomiko
		Verner
		Wasi
	Sault Ste. Marie	Goulais-Batchawana
		Ranger Lake
		Sault Ste. Marie
		Killarney
		Trout Lake
	Sudbury	Wanapitei
		Latchford
		Temagami
	Wawa	Jack Pine River
		Lake Superior Provincial Park
		Tik
Algonquin	Bancroft	Wawa
		Bancroft
		Bracebridge
		Frost Centre
		Minden
	Parry Sound	Georgian Bay
	Pembroke	Parry Sound
		Bonnechere
		Madawaska

	Kapuskasing	Gordon Cosens Forest (Spruce Falls Power and Paper Co. Ltd.)
Northeastern	Espanola	Lower Spanish Forest (E.B. Eddy Forest Products Ltd.)

1991**CROWN MANAGEMENT UNITS**

<u>REGION</u>	<u>DISTRICT</u>	<u>MANAGEMENT UNIT</u>
North Central	Nipigon	Nipigon
	Terrace Bay	Steel River
	Thunder Bay	Fort William
		Port Arthur
Northern		Shebandowan
	Gogama	Shining Tree
	Timmins	Timmins

COMPANY MANAGEMENT UNITS

<u>REGION</u>	<u>DISTRICT</u>	<u>MANAGEMENT UNIT (& COMPANY)</u>
Northwestern	Dryden	Wabigoon* (Great Lakes Forest Products Ltd.)
North Central	Geraldton	Geraldton (Kimberly-Clark of Canada Ltd.)
		Ogoki (Kimberly-Clark of Canada Ltd.)
	Nipigon	Auden (Abitibi-Price Inc.)
		Smooth Rock Falls (Abitibi-Price Inc.)
Northern	Cochrane	

* Scheduled to become an FMA

FMA'S

<u>REGION</u>	<u>DISTRICT</u>	<u>MANAGEMENT UNIT (& COMPANY)</u>
North Central	Nipigon	Lake Nipigon Forest (Domtar Forest Products)

Terrace Bay

Black River Forest
(Quebec North Shore - Ontario
Paper Company)

Thunder Bay

Spruce River Forest
(Abitibi-Price Inc.)

Appendix V

APPENDIX V

PRE-SUBMISSION CONSULTATION

INTRODUCTION

In the preparation of the Class Environmental Assessment for Timber Management, MNR has maintained an open approach to the development and review of the document. In September, 1983, MNR publicly released a draft Class Environmental Assessment which became the subject of an extensive process of public consultation. This process of "pre-submission consultation" was intended to act as a mechanism whereby the Ministry could invite comments from concerned and affected groups on a draft document, and make adjustments prior to formal submission of an environmental assessment to the Minister of the Environment.

In pre-submission consultation, the Ministry sought to involve a broad range of concerned and affected parties. Participants included representatives from the forest industry, the tourism industry, native organizations and Government ministries/agencies, as well as recreation, conservation and environmental interest groups. The list of organizations which were formally invited to participate was derived primarily from the list of participants involved in MNR's land use planning program.

Direct consultation with the general public was not undertaken. However, copies of the draft Class Environmental Assessment were made available for review at the Ministry's District and Regional offices. The Ministry also forwarded the document to the libraries of all Community Colleges and Universities in the Province. In addition, copies of the document were supplied to individuals and other organizations upon request.

MNR initiated pre-submission consultation to solicit and consider the concerns of various groups before preparing and submitting a final Class Environmental Assessment. It was hoped that through pre-submission consultation the Ministry would be able to resolve concerns prior to formal submission, thereby

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minimizing problems during the formal Government review and approval process associated with The Environmental Assessment Act.

The pre-submission consultation process began with a pair of meetings chaired by the Deputy Minister of Natural Resources - one with representatives of the forest industry, and another with representatives of selected interest groups. These meetings were organized to present and distribute the draft Class Environmental Assessment to these groups and to solicit their participation. Lists of organizations invited to those meetings, and attendees, are presented in LIST V-1 and LIST V-2, respectively.

The Ministry also arranged and hosted a media briefing to which representatives from various newspapers and other publications were invited. This briefing publicly introduced the draft Class Environmental Assessment and explained the process of pre-submission consultation.

The pre-submission consultation process has taken place in two phases. In Phase I, submissions were solicited from the various groups involved; the Ministry then considered those submissions and prepared responses to them. In Phase II, MNR presented those responses to concerned groups, and submissions were once again solicited for further consideration. The following discussion presents a detailed description of the pre-submission consultation process in Phase I and Phase II.

Phase I (September, 1983 - January, 1985)

In Phase I, the Ministry organized a series of seminars to describe the general approach to the draft Class Environmental Assessment and the specific details of its contents. Four separate seminars were held in order to accommodate the large number of participants. Each seminar was directed to a specific group of participants (i.e. forest industry representatives, Government ministries/agencies and interest groups). If participants were unable to attend their assigned seminar, attempts were made to accommodate them at an alternate seminar. Lists of organizations invited to those seminars, and attendees, are presented in LIST V-3 and LIST V-4, respectively.

At each seminar, the participants were provided with copies of the draft Class Environmental Assessment as well as a copy of the material used in the presentation. Participants were requested to submit comments to the Ministry regarding the draft document. The Ministry also offered to undertake additional seminars or meetings for the executives or memberships of the various organizations involved. Participants were later sent a reminder letter which formally requested submissions.

In total, forty-one submissions were received. The Ministry received twelve responses from government ministries/agencies; ten from forest industry companies or organizations; sixteen from interest groups, and four from unsolicited sources. Each submission was acknowledged and copies of all submissions were distributed to each respondent and to the Ministry of the Environment. Submissions from unsolicited respondents were individually acknowledged and distributed to others, but these respondents did not receive copies of all other submissions. A list of all respondents is presented in LIST V-5

From late 1983 to late 1984, meetings were held with various groups to discuss their submissions and MNR's proposed approaches to dealing with issues identified in those submissions. MNR met separately with the Ontario Forest Industries Association (OFIA) in the fall of 1983 and the summer of 1984, the Northern Ontario Tourist Outfitters Association (NOTO) in the spring of 1984, and the Ministry of Tourism and Recreation (MTR) in the spring and winter of 1984. Discussions at these meetings were primarily related to the timber management planning process and the proposed changes to accommodate individual concerns. In the fall of 1984, MNR met with the Environmental Approvals and Project Engineering Branch of the Ministry of the Environment to discuss their concerns, in particular MNR's treatment of the use of pesticides in timber management.

In July 1984, a letter which provided a status report on the pre-submission consultation process was forwarded to all participants who made submissions following the initial seminars. The letter also identified the Ministry's intent to hold further discussions with participants prior to finalization and formal submission of the Class Environmental Assessment.

Several meetings were held during the summer and fall of 1984 with the Environmental Assessment Branch of the Ministry of the Environment, at both a staff level and a senior management level. This series of meetings eventually led to the finalization of MNR's responses to the issues identified in Phase I of the pre-submission consultation process.

During the analysis of the submissions, all submissions were summarized and nineteen major issues were identified. The Ministry then produced a summary of comments on those issues for distribution to all respondents. On the basis of the submissions and meetings with various groups, MNR produced proposed responses to each of the issues.

Phase II (February, 1985 - July, 1985)

In Phase II, a series of seminars were again held to present the Ministry's proposed responses to the issues raised in Phase I. Originally, two seminars were planned, one for forest industry companies and organizations and one for Government ministries/agencies and interest groups. A third seminar was added to provide participants with an additional opportunity to attend. Because the Canadian Environmental Law Association (CELA) and the Federation of Ontario Naturalists (FON) were unable to attend any of the seminars, a separate meeting was held for them. Lists of organizations invited to those seminars, and attendees, are presented in LIST V-6 and LIST V-7, respectively.

The purpose of these seminars was to describe the major issues which MNR identified in the review of the Phase I submissions, and to present MNR's proposed approaches to dealing with each of the issues. The seminars provided another opportunity for participants to comment, and again participants were requested to submit comments. A reminder letter was also sent to participants at the seminars to solicit comments.

Ten submissions were received from seminar participants, as well as two responses from unsolicited groups. A list of all respondents is presented in LIST V-8. Each submission was acknowledged and copies of all submissions were distributed to each respondent and to the Ministry of the Environment.

Unsolicited submissions were acknowledged and distributed to others, but these respondents did not receive copies of all other submissions.

Submissions from Phase I and Phase II have been carefully considered in the preparation of this revised Class Environmental Assessment which is submitted to the Ministry of the Environment for formal review and approval under The Environmental Assessment Act.

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LIST V - 1DEPUTY MINISTER'S MEETINGS - INVITATIONSMeeting No. 1 (September 26, 1983) - Forest Industry Representatives

Mr. K. Greaves, President
Ontario Forest Industries Association

Mr. R. C. Gimlin, Chairman
Abitibi-Price Inc.

Mr. J. Kneeland, President
Boise-Cascade Canada Ltd.

Mr. K. Buchanan, President
Buchanan Brothers (Ontario) Ltd.

Mr. J. Smith, President
Domtar Inc.

Mr. J. P. Dubreuil, President
Dubreuil Brothers Ltd.

Mr. J. C. Scarth, President
E. B. Eddy Forest Products Ltd.

Mr. C. Carter, Chairman
Great Lakes Forest Products Ltd.

Mr. W. Sanders, President
Kimberly-Clark of Canada Ltd.

Mr. G. Malette, President
Malette Lumber Inc.

Mr. J. Houghton, President
The Ontario Paper Company

Mr. F. Campling, President
Spruce Falls Power and Paper Co. Ltd.

Meeting No.2 (September 27, 1983) - Interest Group Representatives

Mr. C. Samson, Economic Development Director
Association of Iroquois and Allied Indians

Ms. G. Patterson, Director
Canadian Environmental Law Association

Mr. G. Peters, President
Chiefs of Ontario-Joint Indian Association

Professor W. A. Andrews, President
Conservation Council of Ontario

Mr. M. DeCaen, President
Federation of Northern Ontario Municipalities

Mr. J. G. Strickland, President
Federation of Ontario Cottagers' Association Inc.

Mr. R. Tilt, President
Federation of Ontario Naturalists

Mr. F. Miron, President
Lumber and Sawmill Workers Union, Local 2693

Mr. L. Winkelman, President
Northern Ontario Tourist Outfitters Association

Mr. J. Hook, President
Ontario Federation of Anglers and Hunters

Mr. J. Coats, President
Ontario Professional Foresters Association

Mr. A. Giroux, President
Ontario Trappers Association

Mr. R. Ivey, President
World Wildlife Fund

LIST V-2DEPUTY MINISTER'S MEETINGS - ATTENDEESMeeting No. 1 (September 26, 1983) - Forest Industry Representatives

Mr. K. Greaves

Ontario Forest Industries Association

Mr. R. Ashby

Pulp and Paper Products Group

Mr. Koken

Abitibi-Price Inc.

Mr. K Buchanan

Buchanan Brothers (Ontario) Ltd.

Mr. C. Carter & Mr. R. Chambers

Great Lakes Forest Products Ltd.

Mr. D. H. Linton

Kimberly-Clark of Canada Ltd.

Mr. G. Cooper

The Ontario Paper Company

Mr. F. Campling

Spruce Falls Power and Paper Co. Ltd.

Meeting No.2 (September 27, 1983) - Interest Group Representatives

Ms. G. Patterson
Canadian Environmental Law Association

Mr. G. Sheehy
Canadian Nature Federation

Professor W. A. Andrews
Conservation Council of Ontario

Mr. B. Schingler
Federation of Ontario Cottagers' Association Inc.

Mr. A. Hackman
Federation of Ontario Naturalists

Mr. R. Liddle
Northern Ontario Tourist Outfitters Association

Mr. L. Males
Ontario Federation of Anglers and Hunters

Mr. J. Coats
Ontario Professional Foresters Association

Mr. E. Hawton
Ontario Trappers Association

Mr. S. Price
World Wildlife Fund

LIST V - 3PRE-SUBMISSION CONSULTATION - PHASE ISEMINARS - INVITATIONSSeminar No. 1 (October 6, 1983) - Forest Industry Companies/Organizations

Abitibi-Price Inc.
Algonquin Forestry Authority
Boise-Cascade Canada Ltd.
Buchanan Brothers (Ontario) Ltd.
Canadian Lumberman's Association
Domtar Inc.
Dubreuil Brothers Ltd.
E. B. Eddy Forest Products Ltd.
Great Lakes Forest Products Ltd.
Kimberly-Clark of Canada Ltd.
Lumber and Sawmill Workers Union, Local 2693
Malette Lumber Inc.
Ontario Forest Industries Association
Ontario Lumber Manufacturers' Association
The Ontario Paper Company
Pic River Forest Products Inc.
Spruce Falls Power and Paper Co. Ltd.
Weyerhaeuser Canada Ltd.

Seminar No. 2 (October 7, 1983) - Government Ministries/Agencies

Canadian Forestry Service, Environment Canada
Indian and Northern Affairs Canada
Ministry of Agriculture and Food, Foodland Preservation Branch
Ministry of Citizenship and Culture, Heritage Branch
Ministry of Energy, Conventional Energy Group
Ministry of the Environment, Land Use Coordination Section
Ministry of Industry and Trade, Industrial Policy and Analysis Branch

Ministry of Municipal Affairs and Housing, Local Planning Policy Branch
Ministry of Northern Affairs, Policy Development Branch
Ministry of Tourism and Recreation, Office of the Assistant Deputy Minister
Ministry of Transportation and Communications, Environmental Office
Ministry of Treasury and Economics, Economic Development Branch
Association of Conservation Authorities of Ontario
Federation of Northern Ontario Municipalities
Ontario Hydro, Design and Construction Branch

Seminar No. 3 (October 20, 1983) - Interest Groups

Canadian Nature Federation
Canoe Ontario
Conservation Council of Ontario
Federation of Ontario Cottagers' Association Inc.
Ontario Archaeological Society
Ontario Federation of Anglers and Hunters
Ontario Federation of Snowmobile Clubs
Ontario Professional Foresters Association
Pollution Probe
Prospectors and Developers Association
Provincial Parks Council
Sierra Club of Ontario
Soil Conservation Society of America - Ontario Chapter
Wildlands League

Seminar No. 4 (October 21, 1983) - Interest Groups

Canadian Environmental Law Association
Canadian Institute of Forestry
Canadian Wildlife Federation
Chiefs of Ontario
Energy Probe
Federation of Ontario Naturalists
Kawahna Area Tribal Council
Nature Conservancy of Canada

Northern Ontario Tourist Outfitters Association
Ontario Chamber of Commerce
Ontario Forestry Association
Ontario Heritage Foundation
Ontario Society for Environmental Management
Ontario Trappers Association
World Wildlife Fund

LIST V - 4PRE-SUBMISSION CONSULTATION - PHASE ISEMINARS - ATTENDEESSeminar No. 1 (October 6, 1983) - Forest Industry Companies/Organizations

W. A. Paul & M. R. Innes
Abitibi-Price Inc.

Mr. M. Auld
Buchanan Brothers (Ontario) Ltd.

Mr. J. A. Waddell
E. B. Eddy Forest Products Ltd.

Mr. D. H. Linton
Kimberly-Clark of Canada Ltd.

Mr. J. W. Tomlinson
The Ontario Paper Company

Mr. V. Sleep
Spruce Falls Power and Paper Co. Ltd.

Mr. A. R. Schingler
Federation of Ontario Cottagers' Association
(invited to Seminar 3)

Mrs. S. Trotter
Provincial Parks Council
(invited to Seminar 3)

Seminar No.2 (October 7, 1983) - Government Ministries/Agencies

Mr. N. Smith
Ministry of Agriculture and Food

Ms. M. Greenwald
Ministry of Citizenship and Culture

Mr. P. Shervill
Ministry of Energy

Ms. I. Wygodny
Ministry of the Environment

Ms. R. Samlalsingh
Ministry of Industry and Trade

Mr. B. Dew
Ministry of Municipal Affairs and Housing

Mr. A. Garfin
Ministry of Northern Affairs

Ms. K. Moore
Ministry of Transportation and Communications

Mr. L. Koskitalo
Ministry of Treasury and Economics

Mr. G. Thompson
Ministry of Tourism and Recreation

Mr. C.E. Bishop
Ontario Hydro

Seminar No.3 (October 20, 1983) - Interest Groups

Mr. I.K. Morrison
Canadian Forestry Service, Environment Canada
(invited to Seminar 2)

Mrs. L.W. Ives
Ontario Hydro
(invited to Seminar 2)

Mr. I.D. Bird
Algonquin Forestry Authority
(invited to Seminar 1)

Mr. J.P. Dubreuil
Dubreuil Brothers Ltd.
(invited to Seminar 1)

Mr. G. Sheehy
Canadian Nature Federation

Mr. W.A. Andrews
Conservation Council of Ontario

Mr. M. DeCaen
Federation of Northern Ontario Municipalities
(invited to Seminar 2)

Mr. A. Hackman
Federation of Ontario Naturalists
(invited to Seminar 4)

Mr. L.B. Males
Ontario Federation of Anglers and Hunters

Mr. R.J. Crandell
Ontario Federation of Snowmobile Clubs

Mr. B. Cormack
Ontario Professional Foresters Association

Mr. D. Smith & Mr. B. Griffiths
Prospectors and Developers Association

Mr. B. Fowler
Provincial Parks Council

Mr. R. Burchell
Sierra Club of Ontario

Ms. H. Cook
Wildlands League

Seminar No. 4 (October 22, 1983) - Interest Groups

Mr. G. Scarffe
Indian and Northern Affairs Canada
(invited to seminar 2)

Mr. A. Herridge
Ontario Lumber Manufacturers' Association
(invited to seminar 1)

Mr. E. Tear
Weyerhaeuser Canada Ltd.
(invited to seminar 1)

Ms. G. Patterson
Canadian Environmental Law Association

Mr. D. Anderson
Chiefs of Ontario-Joint Indian Association

Mr. D. Poch
Energy Probe

Mr. D. Starkman
Kayahna Area Tribal Council

Mr. J. Phain
Nature Conservancy of Canada

Mr. R. Liddle
Northern Ontario Tourist Outfitters Association

Mr. J.D. Coats
Ontario Forestry Association

Mr. L. Cook
Ontario Trappers Association

Mr. S. Price
World Wildlife Fund

LIST V-5
PRE-SUBMISSION CONSULTATION - PHASE I
SUBMISSIONS RECEIVED

Government Ministries/Agencies

Canadian Forestry Service, Environment Canada - Mr. I.K. Morrison
Indian and Northern Affairs Canada - Mr. D.G. Scarffe
Ministry of Agriculture and Food - Mr. N. Smith
Ministry of Citizenship and Culture - Ms. M. Greenwald
Ministry of Energy - Mr. R.P. Shervill
Ministry of the Environment - Environmental Approvals and Project Engineering
Branch - Mr. B.R. Ward
Ministry of Industry and Trade - Ms. R. Samlalsingh
Ministry of Northern Affairs - Mr. A. Garfin
Ministry of Tourism and Recreation - Mr. M.J. Baker
Ministry of Transportation and Communications - Mr. J.C. Hughes
Ministry of Treasury and Economics - Mr. L. Koskitalo
Ontario Hydro - Mr. R. Murray

Forestry Industry Companies/Organizations

The Algonquin Forestry Authority - Mr. I.D. Bird
Boise-Cascade Canada Ltd. - Mr. G.J. Garner
Buchanan Forest Products Ltd. - Mr. J.M. Auld
Dubreuil Brothers Ltd. - Mr. J.P. Dubreuil
E.B. Eddy Forest Products Ltd. - Mr. J.A. Waddell
Great Lakes Forest Products Ltd. - Mr. M.R. McKay
Ontario Paper Company - Mr. J.W. Tomlinson
Spruce Falls Power and Paper Co. Ltd. - Mr. V. Sleep
Ontario Forest Industries Association - Mr. K. Greaves
Ontario Lumber Manufacturers' Association - Mr. A.J. Herridge

Interest Groups

Canadian Nature Federation - Mr. G. Sheehy
Canoe Ontario - Mr. R.H. Hickman
Chiefs of Ontario - Ms. G.A. Hill
Conservation Council of Ontario - Mr. W.A. Andrews
Energy Probe - Mr. D. Poch
Federation of Ontario Naturalists - Mr. A. Hackman
Canadian Environmental Law Association - Ms. G. Patterson
Northern Ontario Tourist Outfitters Association - Mr. R.G. Liddle
Ontario Federation of Anglers and Hunters - Mr. R.G. Morgan
Ontario Forestry Association - Mr. J.D. Coats
Ontario Professional Foresters Association - Mr. J.D. Coats
Ontario Trappers Association - Mr. A. Giroux
Prospectors and Developers Association - Mr. J.W. Griffiths
Sierra Club of Ontario - Mr. R. Burchell
Soil Conservation Society of America - Ontario Chapter - Mr. B.D. Boyce
Wildlands League - Mr. P. Garstang

Unsolicited Submissions

Professor K.W. Hearnden, Lakehead University
Mr. T. Miyata, Atikokan
Ontario Camping Association
Toronto Field Naturalists

LIST V -6
PRE-SUBMISSION CONSULTATION - PHASE II
SEMINARS - INVITATIONS

Seminar No.1 (February 13, 1985) - Forest Industry Companies/Organizations

Abitibi-Price Inc.
Algoma Central Railway
Algonquin Forestry Authority
Boise-Cascade Canada Ltd.
Buchanan Forest Products Ltd.
Consolidated-Bathurst Inc.
Domtar Forest Products
Dubreuil Brothers Limited
E.B. Eddy Forest Products Ltd.
Elk Lake Planing Mill Ltd.
Great Lakes Forest Products Ltd.
Great West Timber Ltd.
James River - Marathon Ltd.
Kimberly-Clark of Canada Ltd.
The M.J. Poupore Lumber Company Ltd.
Malette Lumber Inc.
Martin Lumber Ltd.
Midway Lumber Mills Ltd.
Milne and Sons Ltd.
Normick Inc.
Ontario Lumber Manufacturers' Association
Ontario Paper Company
Pic River Forest Products Inc.
Spruce Falls Power and Paper Co. Ltd.
Weyerhaeuser Canada Ltd.

Seminar No.2 (February 22, 1985) - Government Ministries/Agencies
and Interest Groups

Canadian Forestry Service, Environment Canada
Ministry of Citizenship and Culture, Heritage Branch
Ministry of the Environment, Environmental Approvals and Project Engineering
Ministry of Northern Affairs, Policy Development Branch
Ministry of Tourism and Recreation, Deputy Minister's Office
The Algonquin Forestry Authority
Canadian Environmental Law Association
Canadian Nature Federation
Canoe Ontario
Chiefs of Ontario
The Conservation Council of Ontario
Energy Probe
Federation of Ontario Naturalists
Northern Ontario Tourist Outfitters Association
Ontario Federation of Anglers and Hunters
Ontario Forestry Association
Ontario Lumber Manufacturers' Association
Ontario Professional Foresters Association
Ontario Trappers Association
Prospectors and Developers Association
Sierra Club of Ontario
Soil Conservation Society of America - Ontario Chapter
Wildlands League

Seminar No.3 (April 3, 1985) - Alternative Seminar for those unable to attend
Seminar Nos. 1 or 2

Buchanan Forest Products Ltd.
Canadian Environmental Law Association
Canadian Nature Federation
Canoe Ontario
The Conservation Council of Ontario
Dubreuil Brothers Ltd.
Energy Probe
Federation of Ontario Naturalists
Great West Timber Ltd.
James River - Marathon Ltd.
Kimberly-Clark of Canada Ltd.
The M.J. Poupore Lumber Company Ltd.
Malette Lumber Inc.
Midway Lumber Mills Ltd.
Ministry of Citizenship and Culture, Heritage Branch
Milne and Sons Ltd.
Normick Inc.
Ontario Federation of Anglers and Hunters
Ontario Trappers Association
Pic River Forest Products Inc.
Prospectors and Developers Association
Soil Conservation Society of America - Ontario Chapter
Spruce Falls Power and Paper Co. Ltd.
Weyerhaeuser Canada Ltd.

Seminar No.4 (May 7, 1985) - Representatives of CELA and FON
Canadian Environmental Law Association (CELA)
Federation of Ontario Naturalists (FON)

LIST V-7
PRE-SUBMISSION CONSULTATION - PHASE II
SEMINARS - ATTENDEES

Seminar No. 1 (February 13, 1985) - Forest Industry Companies/Organizations

Mr. M. R. Innes & Mr. B. Pauli
Abitibi-Price Inc.

Mr. G. Raines
Algoma Central Railway

Mr. G. J. Garner & Mr. L. Louder
Boise-Cascade Canada Ltd.

Mr. D. A. Ackenhurst & Mr. R. R. Pickering
Consolidated-Bathurst Inc.

Mr. B. E. Jarvis
Domtar Forest Products

Mr. J. A. Waddell, Mr. J. Atherton & Mr. M. Opper
E. B. Eddy Forest Products Ltd.

Mr. R. Magee
Elk Lake Planing Mill Ltd.

Mr. W. S. Moore & Mr. B. Bunney
Great Lakes Forest Products Ltd.

Mr. B. Charlesworth
Martin Lumber Ltd.

**Seminar No.2 (February 22, 1985) - Government Ministries/Agencies
and Interest Groups**

Mr. I. K. Morrison, Mr. G. Huntley & Mr. A. Ballak
Canadian Forestry Service, Environment Canada

Mrs. I. Wygodny
Ministry of the Environment

Mr. A. J. Garfin
Ministry of Northern Affairs

Mr. G. Thompson
Ministry of Tourism and Recreation

Mr. I. D. Bird & Mr. B. Connelly
Algonquin Forestry Authority

Mr. R. B. Loughlan
Ontario Forest Industries Association

Mr. A. Herridge
Ontario Lumber Manufacturers' Association

Mr. W. J. Charlesworth
Martin Lumber Ltd.

Mr. D. P. Achnaipneskun
Chiefs of Ontario

Mr. L. Lindner
Northern Ontario Tourist Outfitters Association

Mr. F. Burrows
Ontario Forestry Association

Mr. J. Coats
Ontario Forestry Association &
Ontario Professional Foresters Association

Mr. R. Burchell
Sierra Club of Ontario

Ms. H. Cook
Wildlands League

Seminar No. 3 (April 3, 1985)

Ms. M. Greenwald & Mr. P. Carruthers
Ministry of Citizenship and Culture

Mr. G. Sheehy
Canadian Nature Federation

Mr. W. A. Andrews
Conservation Council of Ontario

Mr. J. Phillips
Normick-Perron Inc.

Mr. L. Males
Ontario Federation of Anglers and Hunters

Mr. M. Williams
Ontario Forestry Association &
Conservation Council of Ontario

Seminar No.4 - (May 7, 1985)

Ms. G. Patterson
Canadian Environmental Law Association

Mr. M. Singleton
Federation of Ontario Naturalists

LIST V - 8PRE-SUBMISSION CONSULTATION - PHASE IISUBMISSIONS RECEIVEDGovernment Ministries/Agenices

Ministry of Citizenship and Culture - Ms. M. Greenwald

Ministry of the Environment - Environmental Approvals and
Project Engineering Branch - Mr. P. Joseph

Ministry of Northern Affairs - Mr. A. J. Garfin

Forestry Industry Companies/Organizations

Ontario Forest Industries Association - Mr. I. D. Bird

Ontario Lumber Manufacturers' Association - Mr. A. J. Herridge

Interest Groups

Canadian Nature Federation - Mr. G. Sheehy

Chiefs of Ontario - Ms. G. A. Hill

Northern Ontario Tourist Outfitters Association - Mr. D. Rogerson

Ontario Forestry Association - Mr. J. A. Coats

Wildlands League - Mr. P. Garstang

Unsolicited Submissions

Nishnawbe-Aski Nation - Mr. D. Cromarty

Union of Ontario Indians - Ms. K. G. Mason

Appendix VI

APPENDIX VI

TIMBER LICENCES

MNR conveys the right to harvest timber on Crown lands through a variety of "timber licences". The current licensing system was introduced in 1953 with a revision to The Crown Timber Act. The system has essentially remained unchanged except for the introduction of Forest Management Agreements (FMA's) in 1979.

Regardless of the form of tenure or authority granted to companies, there are certain general provisions which are consistent in all forms of licences. Licences are normally limited to specified areas and tree species. However, no licence conveys any rights to Crown land, and the right to cut timber specified in a licence is subject to an annual approval to commence cutting operations. For all licensed areas, the Ministry of Natural Resources retains ultimate responsibility for management planning, regeneration and protection, although licence holders may carry out some of the specific duties associated with those activities.

There are several types of licences which the Ministry employs in the disposition of Crown timber.

Order-In-Council Licences are granted by the Minister of Natural Resources under the authority of subsection 3 (1) of The Crown Timber Act, subject to the approval of the Lieutenant-Governor-in-Council. There is no legislative limit prescribed for the size and period of these licences, but they are generally limited to periods of twenty-one years for larger licence areas (up to approximately 6,000 square kilometres) and five years for smaller licensed areas ranging approximately from 1 to 2,000 square kilometres. There are up to 400 of these licences in effect in any one year.

Order-In-Council Licences have been the principal vehicle for authorizing the disposition of timber between 1920 and the early-1980's. In 1980, more than 90% of the area devoted to timber production in Ontario was licensed under such authorization. This proportion has been decreasing, however, since the introduction of Forest Management Agreements (FMA's) in 1979.

Forest Management Agreements (FMA's) provide for a sharing of timber management responsibilities between the Ministry and a company, and also convey harvesting rights along with other general provisions. The Minister of Natural Resources may enter into such agreements subject to the approval of the Lieutenant-Governor-in-Council.

A growing proportion of the timber resource base is being administered under Forest Management Agreements. By June of 1985, there were a total of 26 Agreements which account for approximately 56% of the total Crown land area under licence. It is expected that Forest Management Agreements will be the principal form of authorization for the disposition of timber in the future, eventually covering approximately 75% of the total licensed area.

Licences For Tendered Sales of Timber were a form of timber disposition which was commonly used in the early part of this century. This form of licensing has been replaced by Order-In-Council Licences and Forest Management Agreements, and now applies to less than 200 square kilometres (i.e. less than 1% of the total licensed area) each year.

These licences involve the sale of timber by tender, either to the public generally or to a particular group of persons who in the opinion of the Minister are interested in such timber as a source of supply for mills in existence at the time of the offer. These licences can be issued with delegated authority by the Regional Director or by the Director, Timber Sales Branch, depending on the size of the licence area and the period of the licence.

District Cutting Licences generally are for the purpose of providing local residents with rights to Crown timber for personal use, such as fuelwood, or for small scale commercial operations. District Cutting Licences are granted under subsection 2(7) of The Crown Timber Act with delegated authority by the District Manager, and are limited to an area of 65 hectares.

The area devoted to District Cutting Licences represents a small portion of the productive land base. The number of such licences is large, however, approaching 10,000 per year, approximately 7,000 of which are for fuelwood purposes.

Salvage Licences were introduced in the late 1940's in order to provide a vehicle for the expedient recovery of killed or damaged timber (i.e. timber affected by fire or insect/disease infestations). The District Manager has been granted the authority to set prices, terms and conditions, and to issue the licence, so that damaged timber can be recovered before it is wasted.

Salvage licences are not limited in size or terms, but are commonly issued for small areas for periods of one or two years. Approximately 40 licences are issued per year, involving a total area of 100 to 500 kilometres.

Third Party Licences may be issued to encourage full utilization of timber on areas which are currently under licence. This procedure allows the prime licensee to assign part of its licence, and may be carried out where a species of timber or volume is excess to that licensee's requirements. The prime licensee and the third party are required to enter into a mutually acceptable agreement which assigns responsibility to the third party.

The Minister's written consent is required for all third party licences; the consent has been delegated to the Director, Timber Sales Branch. A licence is then issued to transfer the legal responsibility to the third party. These licences are usually in the form of Order-in-Council Licences, but may also involve District Cutting Licences for small areas.

Timber Supply Agreements are a form of agreement which the Ministry also employs in the administration of the Crown timber resource. These agreements may be entered into with companies or individuals under Section 4 of The Crown Timber Act for a supply of Crown timber from Crown Management Units. The agreements do not convey any rights to harvest timber; however, the agreement commits the Minister to offering licences if the agreement holder meets other conditions.

Under such agreements, Order-in-Council Licences are issued to either the agreement holder or to an individual who is satisfactory to the Minister and has a contract with the agreement holder.

Appendix VII

APPENDIX VII

AUDIT OF ONTARIO'S FORESTS BY DEAN G. BASKERVILLE

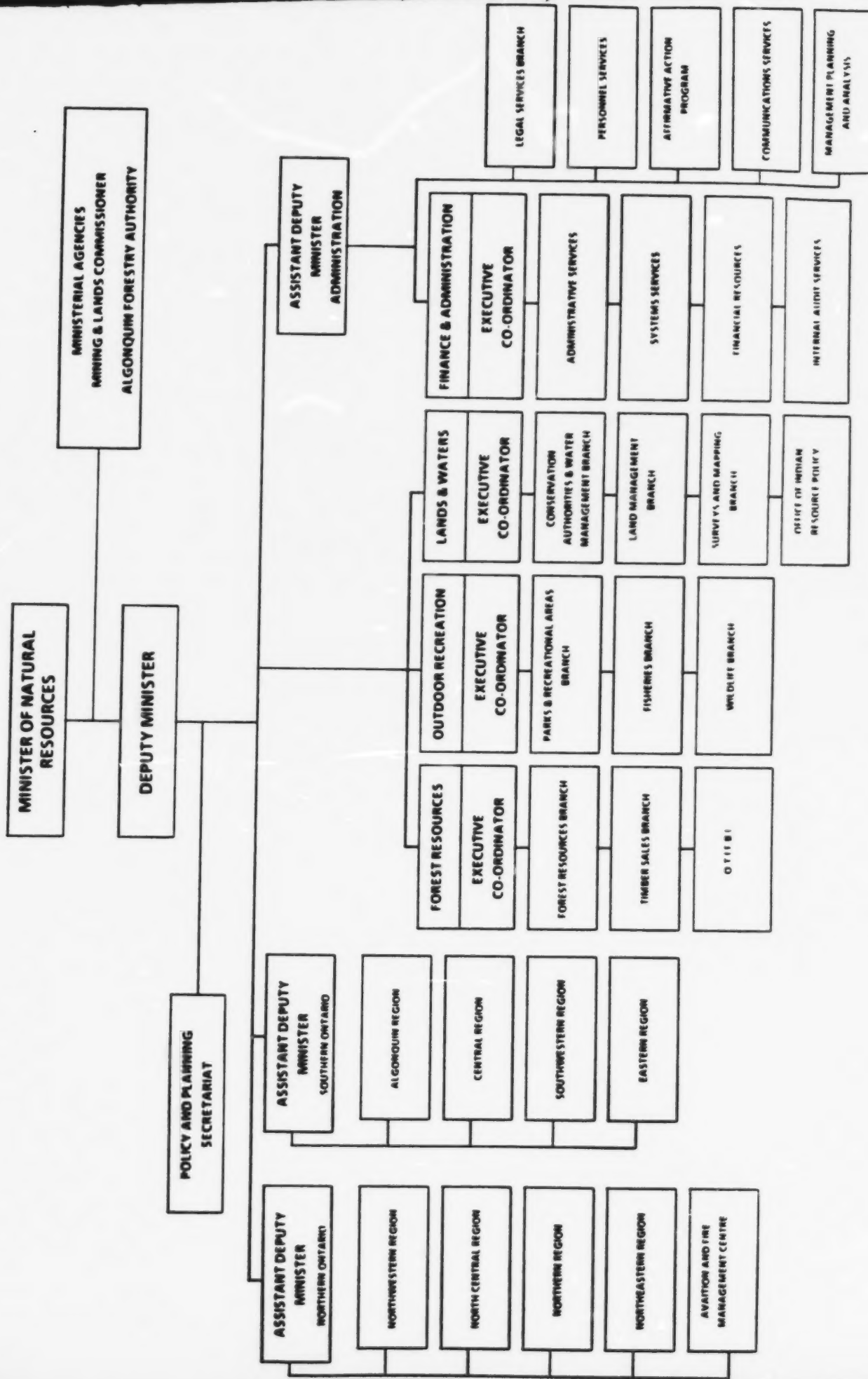
TERMS OF REFERENCE

To review information on the present and projected forest resources of Ontario and in particular determine:

- (1) If the methodology and procedures used to obtain the data are appropriate.
- (2) Whether or not the quantity, quality and distribution of the forest resource data and its reliability are a proper basis for planning and decision-making at provincial, regional and management unit levels, respectively.
- (3) If there is a process whereby the data can be readily updated to ensure its continuing relevance.
- (4) If the forest resource data, together with other information such as mill or regional requirements for wood and losses resulting from fire, insects and disease, are of a manner and form that they can be used to predict future wood supply within defined probability limits.
- (5) The validity of the Ministry's conclusions on present and future wood supplies, based on the existing forest resource information.

Appendix VIII

THE MINISTRY OF NATURAL RESOURCES - ORGANIZATION CHART



THE MINISTRY OF NATURAL RESOURCES - FIELD ORGANIZATION CHART

